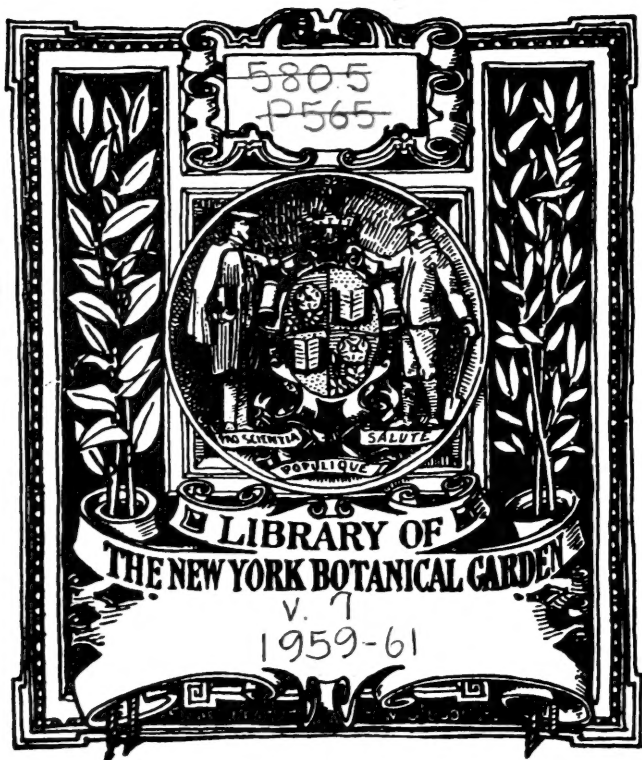
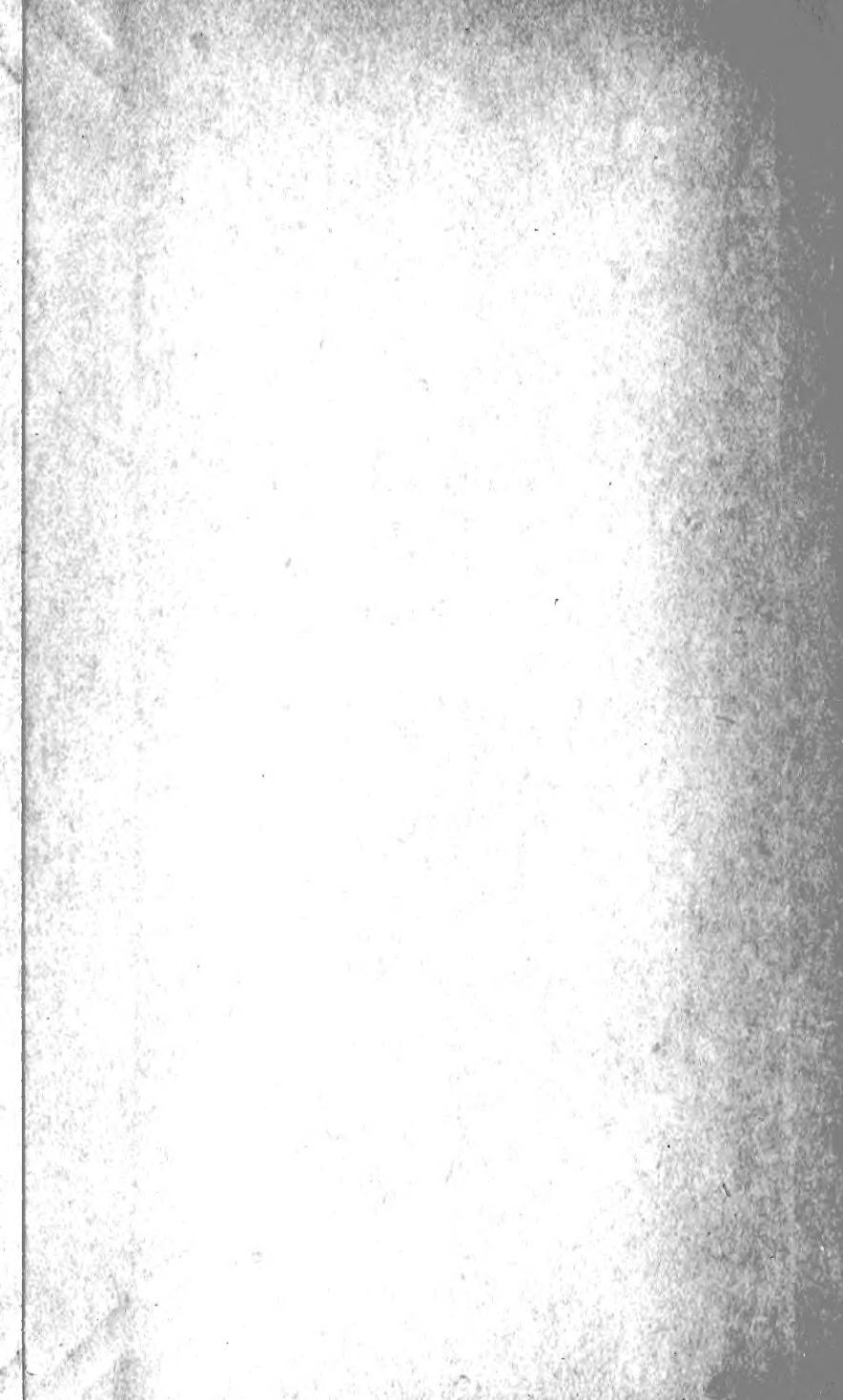


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NOTES ON BROMELIACEAE, XII

Lyman B. Smith

MEXICO

TILLANDSIA CARLSONIAE L. B. Smith, sp. nov.

Ab omnibus speciebus subgeneris Tillandsiae scapo brevissimo, sepalis magnis densissime cinereo-lepidotis differt.

Stemless, flowering only about 25 cm. high; leaves many in a spreading rosette, 4 dm. long, much exceeding the inflorescence, densely subappressed-lepidote throughout; sheaths broadly elliptic, 7-12 cm. long, dark castaneous; blades straight, narrowly triangular, 25 mm. wide, cinereous; scape very short, completely hidden by the leaf-bases; scape-bracts foliaceous but much reduced, densely imbricate; inflorescence densely digitate from 5-6 spikes; primary bracts broadly ovate with a short linear blade, much shorter than the spikes; spikes elliptic, acute, 10-12 cm. long, 3-4 cm. wide, strongly complanate, dense, about 8-flowered with several sterile bracts at base; axis angled, densely lepidote; floral bracts elliptic, acute, to 5 cm. long, exceeding the sepals, ecarinate, subcoriaceous when dry, roseate, densely cinereous-lepidote; flowers short-pedicellate; sepals free, lanceolate, acute, 40 mm. long, ecarinate, densely cinereous-lepidote; petals naked, erect, linear, 6 cm. long, dark purple; stamens exserted. Pl. I, fig. 1: Spike x 1/2; fig. 2: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,022,737, collected along the Pan American Highway between Las Casas and Comitán, State of Chiapas, Mexico, April 6, 1949, by Margery C. Carlson (No. 1697).

MEXICO: Chiapas: Moist woods, Monte Bello, January 1952, Carlson 219 (US). Amatenango, March 26, 1959, MacDougall 417 (US). Teopisca, April 5, 1959, Van Hyning 5915 (US).

DOMINICAN REPUBLIC

PITCAIRNIA JIMENEZII L. B. Smith, sp. nov.

A P. angustifolia Ait. foliis basi excepta inermibus et a P. cubensis (Mez) L. B. Smith inflorescentia plerumque ramosa, sepalis majoribus differt.

Nearly stemless, flowering 7 dm. high; leaves many in a dense rosette, all alike, persistent, 5-10 dm. long; sheaths ovate, castaneous; blades linear, filiform-acuminate, 18 mm. wide, entire or with a few small teeth at base, soon wholly glabrous; scape erect, slender, red, sparsely white-flocculose at the lower nodes; scape-bracts erect, the lower foliaceous and exceeding the internodes, the upper lanceolate, acuminate, much shorter than the internodes; inflorescence few-branched or sometimes simple, to 22 cm. long, very sparsely white-flocculose, soon glabrous, red; primary bracts like the upper scape-bracts, much shorter than the branches; branches suberect, lax, to 14 cm. long; floral bracts lanceolate, acuminate, the lowest exceeding the pedicels;

pedicels very slender, 5 mm. long; sepals lance-oblong, rounded and apiculate, 20 mm. long, ecarinate; petals linear, 45 mm. long, exceeding the stamens, bearing a truncate scale 6 mm. long at the base; ovary half superior; ovules obliquely alate. Pl. I, fig. 3: Base of leaf x 1; fig. 4: Flower (after photo); fig. 5: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,229,834, collected on the ground at El Choco, Province of Puerto Plata, Dominican Republic, by Luis Ariza-Julia (No. 3713 in Hb. Jiménez). Isotype in Herbarium of José de Js. Jiménez.

VENEZUELA

BROCCHINIA BERNARDII L. B. Smith, sp. nov.

A *B. melanacra* L. B. Smith, cui affinis, foliis subpetiolatis apice haud vel vix atris differt.

Caulescent (?), the flowering shoot known only from very old fragments but probably small (much less than 1 meter high); leaves over 4 dm. long, entire, obscurely and sparsely lepidote beneath; sheaths narrowly triangular, inconspicuous, dark castaneous toward base; blades subpetiolate, linear-lanceolate, acuminate, 3 cm. wide, flat, green, concolorous or sometimes slightly darkened toward apex; scape unknown; inflorescence evidently small, laxly tripinnate, glabrous (?); axis very slender, flexuous; primary bracts triangular, shorter than the sterile bases of the branches; branches divergent, 6 cm. long; racemes subdense; floral bracts triangular-ovate, about equaling the pedicels; flowers subspreading; pedicels distinct, 1 mm. long; sepals subelliptic, 1.5 mm. long; ovary almost wholly inferior; capsule ellipsoid, beaked, 5 mm. long. Pl. I, fig. 6: Base of leaf x 1/4; fig. 7: Remnants of flower x 2; fig. 8: Seed x 2.

Type in the herbarium of the Universidad de Los Andes, Mérida, collected on the bank of the Río Chirca, upper valley, Urimán, State of Bolívar, Venezuela, altitude 750 meters, August 1953, by Bernardi (No. 954). The name is in honor of Dr. A. L. Bernardi of the Facultad de Ciencias Forestales, Universidad de Los Andes.

PUYA ARISTEGUIETAE L. B. Smith, sp. nov.

A *P. goudotiana* Mez, cui affinis, planta minor graciliorque, sepalis linearibus obtusis differt.

Flowering about 3 meters high; leaves many in a dense rosette, ca. 1 meter long, the outer spreading, the inner erect; blades linear-triangular, over 2 cm. wide, glabrous above, covered with small pale appressed scales beneath and with coarse spreading scales along the margin, laxly serrate with dark curved antrorse spines 6 mm. long; scape erect, straight; scape-bracts densely imbricate but quickly deciduous, broadly ovate with a foliaceous blade; inflorescence bipinnate, cylindric but not strobilate, over 1 meter long, finely brown-stellate; primary bracts broadly ovate, exceeding the branches, divergent to spreading at anthesis, membranaceous, entire, dark brown at least when dry; branches suberect, laxly few-flowered; floral bracts elliptic,

exceeding the pedicels, membranaceous, dark brown; flowers spreading and decurved at anthesis; pedicels slender, 15 mm. long; sepals linear, rounded and apiculate, 25-27 mm. long; petals showy, 5 cm. long, white, exceeding the stamens, contorted after anthesis; ovary superior; ovules alate. Pl. I, fig. 9: Habit (after photo); fig. 10: Primary bract and spike (after photo); fig. 11: Floral bract x 1; fig. 12: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,269,828, collected on the Páramo de Guirigay, State of Trujillo, Venezuela, altitude ca. 3200 meters, August 1958, by L. Aristeguieta (No. 3539). Dr. Aristeguieta notes that the species is called "Pinuela pitón" and that the central vegetative part is fleshy and edible. It is a pleasure to name this handsome species in honor of one who has done so much to advance our knowledge of the flora of Venezuela.

VENEZUELA: Mérida: Páramo, above "Casita Blanca" on the road to the Sierra Nevada, alt. 2800 m., June 10, 1953, Bernardi 581 (Univ. de Los Andes, Mérida; US phot.).

PUYA VENEZUELANA L. B. Smith, sp. nov.

A P. brachystachya (Baker) Mez, cui affinis, inflorescentia inclinata elongata, sepalis anguste lanceolatis differt.

Flowering nearly 6 dm. high; leaves rosulate, 25 cm. long; sheaths suborbicular, 3 cm. long, glabrous, serrulate toward apex; blades linear, acuminate, pungent, 12 mm. wide, glabrous above, covered beneath with appressed cinereous scales, laxly serrate with spreading antrorse and retrorse brown spines 4 mm. long; scape erect, slender, densely pale-flocculose; scape-bracts erect, densely imbricate, membranaceous, brown when dry, the lowest serrulate and with small foliaceous blades, the highest entire, bladeless, acute; inflorescence more or less nutant, simple, strobilate, cylindric, to 18 cm. long, ca. 2 cm. in diameter, sparsely brown-flocculose; floral bracts like the upper scape-bracts, 45 mm. long, exceeding the sepals; pedicels slenderly obconic, 7 mm. long; sepals narrowly lanceolate, subacute, 18 mm. long, thin; petals over 3 cm. long, naked, blue (! Aristeguieta), contorted after anthesis; stamens included; ovary almost wholly superior; ovules alate. Pl. I, fig. 13: Habit (after photo); fig. 14: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,269,830, collected on rocks, Páramo de Guirigay, State of Trujillo, Venezuela, altitude 3200 meters, August 1958, by L. Aristeguieta (No. 3538).

TILLANDSIA COMPACTA Griseb. var. INTERMEDIA L. B. Smith, var. nov.

A var. compacta omnibus partibus valde majoribus differt.

Approaching Tillandsia ultima L. B. Smith in size of parts but with the more rounded leaves, scape-bracts, and primary bracts of T. compacta Griseb. Dr. Bernardi indicates that the bracts are scarlet.

Type in the New York Botanical Garden, collected on Gaiadendron, State of Mérida, Venezuela, September 17, 1957, by A. L. Bernardi (No. 6214).

VENEZUELA, COLOMBIA

VRIESIA LAXA Mez emend. L. B. Smith

Florifera 23 cm. alta; foliis ad 21 cm. longis; scapi bracteis omnibus imbricatis; bracteis florigeris suberectis et internodiis 4-plo longioribus sed nullo modo imbricatis; pedicellis crassis, 3 mm. longis; sepalis 28 mm. longis.

ARAGUA or CARABOBO: Between Maracai and Choroni, alt. 1000 m., Fendler 2166 in part as to flowering plant and separate inflorescence (GOET, holotype of *Tillandsia laxa* Griseb. of 1864 and of *Vriesia laxa* Mez).

The type sheet of *Vriesia laxa* Mez includes three separate specimens: A, a nearly complete flowering plant, B, a fruiting inflorescence, and C, a complete fruiting plant. A and B are the same species, and I am designating A as the holotype of the emended *Vriesia laxa*. C is *Vriesia scalaris* E. Morr. and is the basis for about half of Mez's original description. Mez followed Grisebach's description of *Tillandsia laxa*, but Grisebach's name does not concern us as it is a later homonym.

Vriesia laxa as now defined keys to *V. morreniana* hort. ex E. Morr. in my "Bromeliaceae of Brazil." It differs from that species in its slender rhachis and cucullate rather than incurved floral bracts.

VRIESIA ROBUSTA (Griseb.) L. B. Smith, comb. nov.

Tillandsia robusta Griseb. Nachr. Ges. Wiss. Goett. for 1864:15. 1865.

Vriesia chlorantha L. B. Smith, Phytologia 5:286, pl. 2, figs. 9-12. 1955.

VENEZUELA: Aragua (?): Biscaina, alt. 900 m., June 23, 1855, Fendler 1525 (GOETT, type).

COLOMBIA: Cundinamarca: Epiphytic, Sesquilé, Dec. 9, 1950, Schneider 1015 (COL, type of *Vriesia chlorantha* L. B. Smith, US phot. 4369).

PERU

PUYA GRACILIS L. B. Smith, Contr. Gray Herb. 98:11, pl. 3, figs. 12, 13. 1932.

PERU: Without definite locality, Weberbauer 6474 (F, type, GH photo). Huancavelica: Tayacaja: "Huayo, parte baja del valle del Mantaro entre Colcabamba y Surcubamba, bosque xerófilo," alt. 2100 m., April 16, 1954, Tovar 1857 (US, USM).

Since nearly all *Puya* species are narrow endemics we can be reasonably sure that Tovar 1857 is a topotype. Furthermore, Weberbauer 6458 is from Huancavelica (cf. *Aeschynomene scoparia* in V. E. Rudd, Contr. U. S. Nat. Herb. 32:129. 1955) and is within twenty numbers of our type.

PUYA HUANCAVELICAE L. B. Smith, sp. nov.

P. reflexiflora Mez in systema Mezii proxima sed bracteis florigeris magnis, pedicellis longis gracilibusque, sepalis

anguste spathulatis differt.

Known only from fragments but probably flowering 1 meter or higher; leaves over 8 dm. long; blades narrowly triangular, acuminate, pungent, 55 mm. wide, smooth and glabrous above, bearing minute pale brown scales between the nerves beneath, laxly serrate with spreading or ascending slender pale brown spines 4 mm. long; scape stout, soon glabrous; inflorescence simple, subdensely cylindric, elongate; axis 2 cm. in diameter, finely lanate; floral bracts reflexed, lanceolate, acute, to 8 cm. long, thin, nerved, soon glabrous, dark brown when dry; pedicels arching-decurved, slender, 2 cm. long, finely white-lanate; sepals narrowly spatulate, obtuse, 40 mm. long, finely white-lanate; petals narrowly elliptic, 75 mm. long, naked; stamens included. Pl. I, fig. 15; Floral bract and flower x 1; fig. 16: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,278,704, collected in rocky thicket, Hacienda Tocas, between Colcabamba and Paucarbamba, Province of Tayacaja, Department of Huancavelica, Peru, altitude 2000-3200 meters, April 24, 1954, by Oscar Tovar (No. 2124). Popular name: "Jesje."

BOLIVIA

PITCAIRNIA NANA (Wittm.) L. B. Smith, comb. nov

Puya nana Wittm. Mededeel Rijks Herb. 29:85. 1916; L. B. Smith, Contr. Gray Herb. 104:79, pl. 3, figs. 14, 15. 1934.

The ovary is about 1/4 inferior and the petals are not strongly contorted after anthesis indicating that this species belongs in Pitcairnia rather than in Puya.

AMAZON BASIN

AECHMEA CHANTINII (Carr.) Baker, Handb. Bromel. 49. 1889.

Billbergia chantinii Carr. Rev. Hort. 50:112, fig. 22. 1878; 52:272, figs. 54-56. 1880.

Aechmea amazonica Ule, Verh. Bot. Ver. Brandenb. 48:136. 1907.

COLOMBIA: Amazonas-Vaupés: Epiphytic, Soratama, Río Apaporis, Feb. 14, 1952, Schultes & Cabrera 16114 (COL, US). Amazonas: Epiphytic, Río Carapana between the mouth and El Encanto, alt. 150 m., May 22-28, 1942, Schultes 3822 (GH). Trapecio Amazónico, Loretoyacu River, alt. 100 m., Oct. 1945, Schultes 6599 (US). Interior regions of Trapecio Amazónico between Amazon and Putumayo watersheds, alt. over 100 m., Oct. 1945, Schultes 6893 (US).

PERU: Loreto: Forest, Caballo-cocha on the Amazon River, Aug. 1929, Williams 2220 (F). Forest, Mishuyacu, near Iquitos, alt. 100 m., Oct.-Nov. 1929, Klug 349 (F, US). On large Ficus tree in the inundation belt of a tributary of Río Itaya, Nov. 5, 1940, Asplund 14341 (S, US). San Martin: Epiphytic, Tarapoto, alt. 750 m., Sept. 1902, Ule 6315 (B, type of Ae. amazonica Ule, F photo 11305); same, L. Williams 5913 (F); 6124 (F).

BRAZIL: Amazonas: Cultivated, Dec. 1953, Foster (US, probable descendant of type). Río Juruá, Ule (obs. in lit.). On Inga, Ilha das Flores, Rio Negro, Feb. 1959, Cavalcante 671 (MG, US).

Plate I

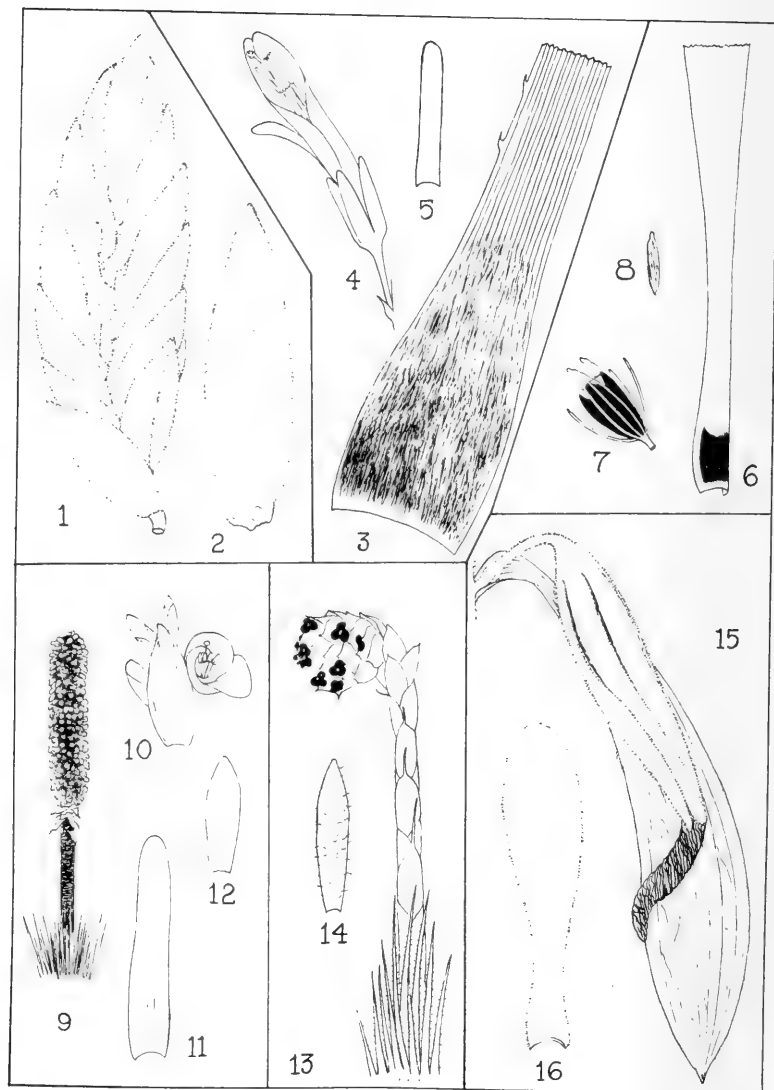


Fig. 1, 2: *Tillandsia carlsoniae*; fig. 3-5: *Pitcairnia jimenezii*;
 fig. 6-8: *Brocchinia bernardii*; fig. 9-12: *Puya aristeguietae*;
 fig. 13, 14: *Puya venezuelana*; fig. 15, 16: *Puya huancavelicae*.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS CITHAREXYLUM. VI

Harold N. Moldenke

CITHAREXYLUM QUERCIFOLIUM Hayek in Engl., Bot. Jahrb. 42: 169--170 [as "Citharexylon"]. 1908; Prain, Ind. Kew. Suppl. 4: 49. 1913.

Literature: Hayek in Engl., Bot. Jahrb. 42: 169--170. 1908; Prain, Ind. Kew. Suppl. 4: 49. 1913; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Prelim. Alph. List Invalid Names 15. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 88. 1942; Moldenke, Alph. List Invalid Names 13. 1942; Moldenke, Alph. List Cit. 2: 328 & 331 (1948), 3: 690 (1949), and 4: 1112. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 72 & 179. 1949; Moldenke, Résumé 82, 254, 416, & 447. 1959.

Clambering or twining (?) shrub; branchlets and twigs rather slender, brown, very minutely and obscurely puberulent on the younger parts, soon becoming glabrous or subglabrate, usually more or less 5-angled, the larger branchlets often prominently 5-ribbed; nodes much ampliate, obscurely annulate; principal internodes 2.7--7.5 cm. long; leaf-scars borne on extremely large and prominent, divergent, corky sterigmata to 5 mm. long; leaves ternate; petioles rather slender, 4--7 mm. long, practically glabrate, flat above, shiny; leaf-blades firmly chartaceous or subcoriaceous, dark-green on both surfaces, becoming subbrunneous in drying, subnitid or dull, often slightly lighter beneath, elliptic, 2.2--8 cm. long, 1.5--3.5 cm. wide, acute or obtuse in outline at the apex, rather remotely and irregularly spinose-dentate along the margins to below the middle or only at the apex, cuneate at the base, glabrous or subglabrate on both surfaces; midrib slender, prominent beneath, usually prominulent above, often slightly tortuous or undate in drying; secondaries very slender, 8--12 pairs, close together, ascending, often not very much arcuate, slightly prominulent on both surfaces; vein and veinlet reticulation abundant, slightly prominulous, especially above; racemes terminal, simple, 2.5--10.5 cm. long, 1--1.5 cm. wide during anthesis, rather densely many-flowered, erect or subnutant; peduncles and rachis slender, minutely puberulent, the former 0.5--2 cm. long and often subglabrous; pedicels rather thick, about 1 mm. long, puberulent or glabrate; bracts absent; bractlets few, linear, about 4 mm. long, ternate; prophylla setaceous, rather stout, about 1 mm. long; flowers subsecund, fragrant; calyx campanulate, about 4 mm. long, its rim very shortly 5-dentate; corolla white, about 8 mm. long; fruiting-calyx and fruit not known.

The type of this distinctive species was collected by August Weberbauer (no. 4248) on the western edge of the Marañon valley between Balsas and Celendin, at an altitude of 3100 to 3200 meters, Cajamarca, Peru, on June 22, 1904, and is deposited in the herbarium of the Botanisches Museum at Berlin. The Macbride photograph 17598, in at least the Krukoff Herbarium, is inscribed "Paraguay" in error. In all, 6 herbarium specimens, including the

type, and 7 mounted photographs have been examined. It is known thus far only from the type collection.

Citations: PERU: Cajamarca: Weberbauer 4248 [Macbride photos 17598] (B--type, B--isotype, Cb--isotype, F--663027--photo of type, F--686495--isotype, K--photo of type, Kr--photo of type, N--isotype, N--photo of type, N--photo of type, S--photo of type, Z--photo of type).

CITHAREXYLUM QUITENSE Spreng. in L., Syst. Veg., ed. 16, 2: 763 [as "Citharexylon"]. 1825; Schau. in A. DC., Prodr. 11: 611. 1947.

Synonymy: Citharexylum molle H.B.K., Nov. Gen. & Sp. Pl. 2: 257--258. 1818 [not C. molle Salisb., 1796, nor Jacq., 1804]. Citharexylon molle Humb. & Bonpl. ex Steud., Nom. Bot., ed. 1, 202. 1821. Citharexylon molle H.B.K. apud Walp., Repert, 4: 77, in syn. 1845. Citharexylum molle Hook. ex Moldenke, Prelim. Alph. List Invalid Names 17, in syn. 1940.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 257--258. 1818; Steud., Nom. Bot., ed. 1, 202. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 763. 1825; Steud., Nom. Bot., ed. 2, 1: 375. 1840; Walp., Repert. 4: 77. 1845; Schau. in A. DC., Prodr. 11: 611. 1847; Jacks., Ind. Kew. 1: 550. 1893; Moldenke, Alph. List Common Names 22. 1939; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Prelim. Alph. List Invalid Names 17. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 88. 1942; Moldenke, Alph. List Invalid Names 14. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 50 & 266 (1946), 2: 344, 351, 447, & 573 (1948), 3: 696, 737, & 956 (1949), and 4: 1207. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 179. 1949; Moldenke, Résumé 79, 254, 257, & 447. 1959.

Shrub or slender much-branched tree, to 6 m. tall, generally not over 5 m. tall; branchlets and twigs medium, sharply tetragonal, hollow, very light-gray or stramineous, minutely and obscurely short-pubescent or subglabrate, often more or less margined; nodes annulate; principal internodes 0.7--3 cm. long; leaves decussate-opposite, borne on short, stout, closely appressed or ascending, corky sterigmata; petioles slender, 6--10 mm. long, minutely puberulent, flattened above, nigrescent in drying, decidedly margined; leaf-blades membranous, dark-green above, much lighter beneath, dull, very broadly oblong-elliptic or suborbicular, 5--11.5 cm. long, 3--7.5 cm. wide, acute or subacuminate at the apex, entire or rarely with 2 or 3 broad and tooth-like angulations near the apex, cuneate at the base and prolonged into the petiole, with a pair of elongate black glands on the prolongation, glabrous above (except along the more or less puberulent midrib) and roughened by the more or less prominent venation, very densely short-tomentose with simple incanous hairs beneath; midrib slender, slightly impressed above, prominent and nigrescent in drying beneath, densely puberulent, especially beneath; secondaries slender, 4--8 pairs, arcuate-ascending, prominent on both surfaces,

but only very slightly so above, often forking near the summit and not plainly anastomosing, often not very much arcuate; vein and veinlet reticulation very fine, obscured by the pubescence beneath, very slightly prominent above; inflorescence showy; racemes terminal, nutant, 6.5--13.5 cm. long, 1.5--2 cm. wide in fruit, rather many-flowered, simple; peduncles slender, 2--3 cm. long, stramineous, densely puberulent; rachis slender, densely puberulent; pedicels (in fruit) short and stout, about 1 mm. long, densely puberulent; bracts and bractlets absent; prophylla minute, setaceous; flowers about the size of those of Myosotis scorpioides L., the buds rather dark-yellow; calyx membranous, urceolate-campanulate, lax, sub-5-nerved, puberulent, its rim obsoletely and unequally 5-dentate; corolla hypocrateriform, pale-yellow or yellowish-white, its tube cylindric, twice as long as the calyx, ampliate above, pubescent toward the apex within, villous in the throat, its limb 5-parted, very wide-spreading, the lobes subrotund, obtuse at the apex, revolute on both margins, shorter than the tube, subequal, villous-barbate toward the base; stamens inserted at the middle of the corolla-tube, subdidynamous, included; filaments filiform, somewhat pilose; anthers dorsifixed, oblong, obtuse, erect, bilocular, the thecae dehiscing longitudinally; style filiform, erect, half as long as the corolla-tube, glabrous; stigma subcapitate; ovary obovate, glabrous; fruiting-calyx indurated, shallowly cupuliform, about 3 mm. long and 9 mm. wide, minutely puberulent or subglabrate, its rim truncate and subentire or slightly scarious-undulate; fruit drupaceous, oblong, about 9 mm. long and 7 mm. wide (immature?), not very fleshy, orange-red or scarlet when fresh, black and 2-sulcate in drying, short-apiculate when immature, mucilaginous.

The type of this distinctive species was collected by Aimé Jacques Alexandre Bonpland (no. 3817) at Guayaquil, Guayas, Ecuador, and is deposited in the Bonpland Herbarium at the Muséum National d'Histoire Naturelle at Paris. Sprengel's name is based on the same type. The species has been collected in anthesis in January and February, and in fruit from January to March. It is not certain that the fruit examined was mature because of its still apiculate apex. Judging from the width of the fruiting-calyxes, it is very probable that the mature fruit is much larger and perhaps more fleshy than is indicated in the above description. Spruce describes it as "miniati subbaccati", and collected the plant in shrubbery along the Río Daule near Guayaquil. It has also been found in woods, thickets, and savannas and along roadsides, and Haught says it is "common" at altitudes of less than 100 meters. Vernacular names are "muyuyu" and "muyuyu del monte". It has occasionally been confused with the genus Duranta by herbarium workers. In all, 22 herbarium specimens, including the types of all the names involved, and 6 mounted photographs have been examined.

Citations: ECUADOR: El Oro: Asplund 15682 (S). Guayas: Asplund 5170 (N, S), 15233 (S), 15323 (S); Bonpland 3817 [Mac-

bride photos 39481] (Kr—photo of type, N—photo of type, N—photo of type, P—type, Z—photo of type); Haught 3034 (N); Mille 842 (F—920167, G), 866 (F—768055); Spruce 6320 (B, Bm, Cb, Ed, K, L, N, N—photo, P, V—106468, V—166960, X, Z—photo). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 23 (Q).

CITHAREXYLUM RACEMOSUM Sessé & Moc., Pl. Nouv. Hisp., ed. 1, 103 [as "Cytharexylum"]. 1889; ed. 2, 96—97. 1893.

Literature: Sessé & Moc., Pl. Nouv. Hisp., ed. 1, [La Natural-eza II, 1: app.] 103. 1889; Sessé & Moc., Pl. Nouv. Hisp., ed. 2, 96—97. 1893; Sessé & Moc., Fl. Mex., ed. 1, 152 (1894) and ed. 2, 166. 1896; Hill, Ind. Kew. Suppl. 7: 50. 1929; Moldenke, Geogr. Distrib. Avicem. 13. 1939; Moldenke, Prelim. Alph. List Invalid Names 24. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 88. 1942; Moldenke, Alph. List Invalid Names 23. 1942; Moldenke, Alph. List Cit. 2: 339 (1948) and 3: 926. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 179. 1949; Moldenke, Résumé 35, 277, & 447. 1959.

Shrub, to 1.8 m. tall; branches opposite, rather thick, terete; branchlets slender, acutely tetragonal, red-brown when fresh, nigriscent in drying, geniculate, glabrous; twigs very slender, light-gray or white, acutely tetragonal, lenticellate, corky, glabrous; nodes annulate; principal internodes 5—22 mm. long; leaf-scars borne on corky sterigmata about 1 mm. long; leaves decussate-opposite; petioles 1—3 mm. long and winged, or perhaps better considered obsolete; leaf-blades chartaceous, rather dark-green above, lighter beneath, elliptic or narrow-elliptic, 1.5—3 cm. long, 3—10 mm. wide, acute at the apex, entire, long-acuminate and attenuate at the base, very minutely pulverulent-puberulent or glabrous on both surfaces, the margins usually slightly subrevolute and pilosulous; midrib very slender, subprominent on both surfaces (rather more acutely so above) except toward the apex beneath; secondaries very slender, about 3 per side, arcuate-ascending, subprominent above, usually less so beneath; vein and veinlet reticulation obscure; inflorescence axillary, simple, few- or 1-flowered, shorter than the subtending leaves; peduncles obsolete; pedicels (in fruit) slender, 4—5 mm. long, gray, slightly downwardly curvate, minutely puberulous; calyx-rim dentate; corolla white, the lobes red-striped above; fruiting-calyx patelliform, about 5 mm. wide, glabrate or minutely puberulous; fruit drupaceous, subglobose, about 7 mm. long and wide.

The type of this remarkable species was collected by Martín Sessé y Lacasta, José Mariano Mociffo, Juan Diego del Castillo, and José Maldonado (no. 2365) at Puranyuco, near Salamantica, Guanajuato, Mexico, and is deposited in the herbarium of the Jardín Botánico at Madrid. One of the two labels on the type specimen is inscribed "Citharexylum racemosum. N." and the other reads "No. 89. Citharexylum cinereum. N". The latter is probably on the sheet in error; Sessé & Mociffo's C. cinereum is conspecific with C. fruticosum L. as has been verified by examination of their type material.

C. racemosum has been collected in anthesis in July and is known thus far only from the original collection. Two herbarium specimens, including the type, and 2 mounted photographs have been examined.

Citations: MEXICO: Guanajuato: Sessé, Mociffo, Castillo, & Maldonado 2365 (F--849473--isotype, N--photo of type, Q--type, Z--photo of type).

CITHAREXYLUM RECURVATUM Greenm., Field Columb. Mus. Publ. Bot. 2: 189--190. 1907.

Synonymy: Citharexylum villosum Donn. Sm. apud Greenm., Field Columb. Mus. Publ. Bot. 2: 190, in syn. 1907 [not C. villosum Jacq., 1781, nor Griseb., 1909, nor Chapm., 1913].

Literature: Greenm., Field Columb. Mus. Publ. Bot. 2: 189--190. 1907; Prain, Ind. Kew. Suppl. 4: 49. 1913; Standl., Field Mus. Publ. Bot. 18: 1001. 1938; Moldenke, Geogr. Distrib. Avicenn. 17 & 36. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 23, 71, & 88. 1942; Moldenke, Alph. List Invalid Names 58. 1942; Moldenke, Alph. List Cit. 1: 123, 142, & 167. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 5. 1947; Moldenke, Alph. List Cit. 2: 345 & 347 (1948), 3: 948 (1949), and 4: 1023, 1057, & 1141. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39, 40, 158, & 179. 1949; Moldenke, Résumé 46, 48, 215, 259, & 447. 1959.

Shrub or tree, to 20 m. tall; branchlets and twigs medium-slender, brown, lenticellate, glabrous, acutely or obtusely tetragonal, the branchlets sometimes terete; nodes obscurely or not at all annulate; principal internodes 2--4.5 cm. long; leaf-scars borne on stout ascending sterigmata to 4 mm. long; leaves decussate-opposite or approximate; petioles rather stoutish, 1--1.5 cm. long, deeply sulcate above, glabrous, more or less margined to the base; leaf-blades very firmly chartaceous, rather dark grayish-green above, deeper green beneath, very shiny (especially above), oblong-lanceolate to subovate, 3.2--11.5 cm. long, 1.4--3.7 cm. wide, acute to obtuse at the apex, entire, acute or abruptly acute at the base and prolonged into the petiole, often very slightly subrevolute (especially at the base) in drying, bearing a pair of small black glandular disks on the prolongation, glabrous on both surfaces; midrib rather slender, plane above, prominent beneath; secondaries slender, 6--8 pairs, irregular, arcuate-ascending, prominent beneath and very slightly so above; vein and veinlet reticulation very slightly prominent above, more or less obscure beneath; racemes terminal, 13--16 cm. long, 1--1.8 cm. wide, simple or paniculate, erect or mutant, rather densely many-flowered; peduncles and rachis rather slender, brown, ribbed, glabrous, the former 1--3.3 cm. long; pedicels slender, 1.5--3 mm. long, glabrous; bracts and bractlets absent; prophylla setaceous, about 1 mm. long; flowers small; calyx tubular-campanulate, about 3 mm. long, glabrous, its rim shallowly sinuate and minutely 5-denticulate; corolla-limb 5-lobed, the lobes subequal; perfect stamens 4, in-

cluded; style glabrous; ovary glabrous; fruiting-calyx light, cupuliform, about 2.5 mm. long and 5 mm. wide, glabrous, shiny, ribbed, its rim subtruncate or eventually more or less scarious; fruit drupaceous, at first yellow or orange, later bluish-black, oblong, 5--7 mm. long, about 5 mm. wide, fleshy, glabrous, shiny, nigrescent and very much wrinkled in drying; pyrenes elliptic-oblong, 4--5 mm. long, 3--3.5 mm. wide, about 2 mm. thick, smooth.

The type of this species was collected by Juan J. Cooper (no. 474; changed to no. 5889 in Smith's re-numbering) in cultivation on the campo along the Río Reventado, Cartago, Costa Rica, at an altitude of 6000 feet, in April, 1888, and is deposited in the Gray Herbarium of Harvard University. Cooper's original notes state that the plant was cultivated, but this fact was not copied by Smith on his printed labels, so most subsequent authors have regarded the species as native to Cartago, which, of course, it may well be, although it has not been subsequently found there. It has been confused in herbaria with *C. caudatum* L., *C. donnell-smithii* Greenm., and *C. quadrangulare* Jacq. It has been found at altitudes of 1500 to 2000 meters, in fruit in June and July. A vernacular name for it is "palo paloma". Allen reports that it is "very common in potreros". In all, 12 herbarium specimens, including the types of both the names involved, and 5 mounted photographs have been examined.

Citations: PANAMA: Chiriquí: P. H. Allen 4730 (N); Davidson 899 (F--934661); Woodson, Allen, & Seibert 870 (F--969448, N). Province undetermined: Duchassaing s.n. (G). CULTIVATED: Costa Rica: J. J. Cooper 474 [J. D. Smith 5889] (B--isotype, B--photo of type, G--type, K--isotype, K--photo of type, N--isotype, N--photo of type, S--photo of type, W--260596--isotype, W--1323222--isotype, W--1323223--isotype, Z--photo of type).

CITHAREXYLUM REITZII Moldenke, Phytologia 3: 59. 1949.

Literature: Moldenke, Phytologia 3: 59 & 74. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 76 & 179. 1949; Salisb., Ind. Kew. Suppl. 11: 55. 1953; Moldenke, Résumé 88 & 447. 1959.

Tree, to 5 m. tall; branchlets and twigs rather slender, grayish or brownish, obtusely tetragonal, very obscurely and irregularly pilosulous or strigillose, glabrescent in age, rather abundantly lenticellate with more or less longitudinally elongate lenticels; nodes not annulate; principal internodes 3--6 mm. long, or much more abbreviated on lateral twigs; leaves decussate-opposite, brunnescent or nigrescent in drying; petioles about 1 cm. long, very minutely and obscurely strigillose, narrowly winged and merging into the blade; leaf-blades elliptic-obovate, chartaceous, 3--9 cm. long, 1.2--3 cm. wide, varying from rounded (on small leaves) to acute or shortly subacuminate at the apex, long-acuminate into the petiole at the base, rather regularly subappressed-serrate on the margins from the widest point to the apex, glabrous on both surfaces or very obscurely

strigillose on the lower midrib and minutely barbellate in the axils beneath; midrib flat above, prominulous beneath; secondaries slender, 2--4 per side, arcuate-ascending, flat above, subprominulous beneath; vein and veinlet reticulation obscure; inflorescence axillary, racemiform, about 8 cm. long, many-flowered; peduncle and rachis angular, nigrescent in drying, minutely and obscurely strigillose; pedicels very slender, about 1 mm. long, minutely puberulent; calyx about 2.5 mm. long, glabrous except for the ciliolate subtruncate rim; corolla white, apparently about 5 mm. long, the lobes white-woolly; fruiting-calyx and fruit not seen.

The type of this species was collected by my good friend and colleague, Raulino Reitz (no. C.175) -- in whose honor it is named -- "na capoeira da vargem", Rodeio da Areia, Arar, Santa Catarina, Brazil, on November 2, 1943, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collector describes the fruit as "baga de 1--1,50 cm." He also collected the species in small woods at Sombrio, near Araranguá, twenty days later. In all, 3 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: BRAZIL: Santa Catarina: Reitz 1002 [Herb. Anchieta 30452] (Rb), C.175 [Herb. Jard. Bot. Rio de Jan. 51362] (F--photo of type, N--type, N--isotype, N--photo of type, Sg--photo of type, Z--photo of type).

CITHAREXYLUM RETICULATUM H.B.K., Nov. Gen. & Sp. Pl. 2: 257.

1817 [not C. reticulatum Donn. Sm., 1907, nor Cham., 1909].

Synonymy: Citharexylon reticulatum Humb. & Bonpl. apud Steud., Nom. Bot., ed. 1, 202. 1821. Citharexylon reticulatum Bonpl. apud Spreng. in L., Syst. Veg., ed. 16, 2: 764. 1825. Ehretia articulata Willd. ex Cham., Linnaea 5: 97. 1830; Walp., Repert. 4: 75, in syn. 1845. Citharexylon reticulatum H.B.K. apud Walp., Repert. 4: 75. 1845. Citharexylum reticulatum Kunth apud Schau. in A. DC., Prodr. 11: 613. 1847. Ehretia articulata Walp. ex Jacks., Ind. Kew. 1: 823, in syn. 1893. Citharexylon reticulatum Kunth ex Engelhardt, Senckenberg. Naturf. Gesell. Abh. 9: 31. 1895.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 287. 1817; Roem. & Schult., Syst. Veg. 4: 805. 1819; Steud., Nom. Bot., ed. 1, 202. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 764. 1825; Cham., Linnaea 5: 97. 1830; Steud., Nom. Bot., ed. 2, 1: 375. 1840; Walp., Repert. 4: 75. 1845; Jacks., Ind. Kew. 1: 550 & 823. 1893; Engelhardt, Senckenberg. Naturf. Gesell. Abh. 9: 31. 1895; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 88. 1942; Moldenke, Alph. List Invalid Names 24. 1942; Moldenke, Alph. List Cit. 1: 50 (1946), 2: 351 & 573 (1948), and 3: 696. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 72 & 179. 1949; Moldenke, Résumé 79, 82, 254, 258, 284, 415, 416, & 447. 1959.

Tree; branches and branchlets unarmed, whitish, rugose, glab-

rous, the younger parts tetragonal; leaves decussate-opposite, petiolate; leaf-blades coriaceous, varying from oblong, lanceolate-oblong, or elliptic to oval, ovate, or obovate, 5 or more cm. long, 1.6--2.4 cm. wide, acute or obtuse to retuse at the apex, entire (or rarely spinose-dentate) at the margins, narrowed into the petiole at the base, shiny above, glabrous on both surfaces when mature, pubescent on the midrib beneath when immature; midrib, secondaries, and veinlet reticulation very prominent beneath; racemes spike-like, erect, terminal, solitary, about 4 cm. long; flowers pedicellate; bractlets linear; pedicels puberulent; rachis puberulent; calyx campanulate, glabrous, 5-nerved, its rim 5-dentate; corolla white, longer than the calyx, its limb spreading, 5-parted, the lobes subrotund, equal; stamens 5, inserted at the apex of the corolla-tube; filaments very short; style short; stigma capitate; fruit drupaceous, globose, black, about the size of a pea (Pisum sativum L.), partly invested by the fruiting-calyx.

The type of this species was collected by Aimé Jacques Alexandre Bonpland (no. 3419) on the banks of Rio Catamayo, at an altitude of 2150 meters, near the town of Gonzanama, in the temperate Andes of Loja, Ecuador, and is deposited in the Bonpland herbarium at the Muséum National d'Histoire Naturelle at Paris. All older authors state that the type locality is in Peru, which was true then, but this area is now in Loja, Ecuador. The species has been collected on riverbanks and in low hills, at altitudes of 2150 to 3000 meters, blooming in November. It has been confused in herbaria with the genus Duranta. In passing, one may note that it is very possible that the taxon now passing as C. laurifolium Hayek is conspecific with C. reticulatum.

Schauer included C. affine Mart. & Gal. and C. scariosum Moc. & Sessé in the synonymy of C. reticulatum, but examination of the types reveals that the former is actually C. hexangulare Greenm. while the latter is C. ellipticum Sessé & Moc. He notes that the original descriptions of both of these plants agree completely with the characters of C. reticulatum except for the one phrase "venis nervoque subtus valde prominentibus" which they do not give. This shows again the danger inherent in the reduction of names without actual examination of the types on which they are based. If Schauer had seen the types of these two binomials he would never have considered them conspecific with C. reticulatum.

Walpers, Schauer, and Chamisso all state that C. reticulatum is found in Peru and Mexico, but the Mexican specimens to which they refer are all C. ellipticum or C. hexangulare.

In all, 3 herbarium specimens and 5 mounted photographs have been examined, including the type. Unfortunately, however, the type of Ehretia articulata has not yet been seen by me.

Citations: COLOMBIA: Department undetermined: Linden 133 (Br). ECUADOR: Loja: Bonpland 3419 [Macbride photos 39479] (F--1038404--photo of type, Kr--photo of type, N--photo of type, N--photo of

type, P--type, Z--photo of type). PERU: Lima: Ferreya 10426 (Z).

CITHAREXYLUM RETIFORME Engelhardt, Senckenberg. Naturf. Gesell.

Abh. 19: 31, pl. 5, fig. 10 [as "Citharexylon"]. 1895; Moldenke, Geogr. Distrib. Avicenn. 41. 1939.

Literature: Engelhardt, Senckenberg. Naturf. Gesell. Abh. 19: 31, pl. 5, fig. 10. 1895; Moldenke, Geogr. Distrib. Avicenn. 41. 1939; Moldenke, Prelim. Alph. List Invalid Names 15. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 75 & 88. 1942; Moldenke, Alph. List Invalid Names 13. 1942; H. N. & A. L. Moldenke, Plant Life 2: 42. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 166 & 179. 1949; Moldenke, Résumé 226, 254, & 447. 1959.

Illustrations: Engelhardt, Senckenberg. Naturf. Gesell. Abh. 19: pl. 5, fig. 10. 1895.

Leaf-blades leathery, elliptic, subacuminate at the apex, entire; midrib strong; secondaries arising from the midrib at acute angles and extending in arcuate fashion; venation network composed of larger delicate mesh ["dass Netzwerk ist von grösseren zarten Maschen gebildet"].

Engelhardt says further that "Das Blattfragment zeigt die auf der einen Hälfte umgebogene Unterseite, die bei der Zeichnung auf die Ebene projiziert wurde. Die Nervillen erweisen sich weder als eingesenkt, noch als herfortretend." The species is based on a specimen collected in the fossil condition by Dr. Moritz Alphons Stübel in the mines of Santa Ana on the Río Guama, near Garrapata, probably in Antioquia, Colombia, and is of Miocene age. Engelhardt says that the fossil specimen much resembles the larger leaves seen by him on dried herbarium specimens labeled "Citharexylon quadrangulare Jacq." and "Citharexylon cinereum L." in the Dresden herbarium. In both cases he is probably referring to C. spinosum L., but the species seems rather to be most closely related to the modern C. reticulatum H.B.K. of the same general area.

CITHAREXYLUM RIGIDUM (Briq.) Moldenke, Phytologia 1: 17. 1933.

Synonymy: Citharexylum myrianthum var. rigidum Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 317--318. 1904. Citharexylum rigidum Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 317, in syn. 1904; J. A. Clark, Card Ind. issue 30. n.d.

Literature: Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 317--318. 1904; Chid. & Hassler, Bull. Herb. Boiss., ser. 2, 4: 1166 [Plant. Hassler. 502]. 1904; Moldenke, Phytologia 1: 17. 1933; Hill, Ind. Kew. Suppl. 9: 67. 1938; Moldenke, Geogr. Distrib. Avicenn. 26 & 28. 1939; Moldenke, Prelim. Alph. List Invalid Names 17. 1940; Moldenke, Lilloa 6: 319 (1941) and 8: 415. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 40, & 88. 1942; Moldenke, Alph. List Invalid Names 14. 1942; Moldenke, Alph. List Cit. 1: 27 (1946), 2: 347 (1948), and 3: 848. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 76, 98, & 179. 1949; Moldenke, Résumé 88, 116, 257, 258, & 447.

1959; J. A. Clark, Card Index issue 30. n.d.

Shrub or medium-sized tree, to 8 m. tall; branchlets and twigs medium or slender, stramineous or light-gray, very obtusely tetragonal or almost subterete, woody, glabrous, the twigs usually yellowish-green; nodes not annulate; principal internodes 1.5—3.7 cm. long; leaf-scars borne on rather stout ascending and corky sterigmata 1—4 mm. long; leaves decussate-opposite or ternate, very often subopposite or approximate; petioles slender, 0.5—2 cm. long, glabrous, flattened or canaliculate above, slightly margined; leaf-blades firmly thick-chartaceous, rigid, rather uniformly gray-green on both surfaces, lanceolate-oblong or oblong to oblanceolate, 5.8—11.5 cm. long, 1.5—3 cm. wide, acute or subacute to short-acuminate (rarely obtuse or retuse) at the apex, entire, gradually and regularly convex along the margins, cuneate or acuminate at the base, glabrate on both surfaces (or very lightly and obscurely pilosulous along the midrib beneath), shiny above, more or less prolonged into the petiole and often bearing 1 or 2 large black crateriform glands on the prolongation; midrib prominent beneath, prominent above; secondaries very slender, 6—8 pairs, prominent beneath, ascending at an angle of about 45° , almost straight; vein and veinlet reticulation numerous, slightly prominent beneath, hardly prominent but very plainly discernible above; racemes axillary and terminal, 10—25 cm. long, to 1.5 cm. wide, simple, rather loosely many-flowered, erect or nutant; peduncle and rachis slender or stoutish, brownish or stramineous, sparsely puberulent or becoming glabrous, the former 2—4.5 cm. long; fruiting-pedicels stout, nutant, 2—3 mm. long, sparsely puberulent or finally glabrate; bracts and bractlets apparently absent; prophylla linear-lanceolate or setaceous, 1—2 mm. long; flowers not known; fruiting-calyx light-colored, incrassate, rigidly subcoriaceous, cupuliform or cyathiform, 4—6 mm. long, 6—8 mm. wide, sparsely puberulent, becoming glabrate, impressed-punctate, not venose, its rim deeply 4-lobed or irregularly 5-lobed, the lobes ovate-rotund or triangular, 1—2 mm. long, 2—4 mm. wide, acute at the apex, scarious-margined; fruit oblong, 8—9 mm. long, 5—7 mm. wide, not fleshy, very light-brown and 2-sulcate in drying, shiny, red subcarneose when fresh.

The type of this species was collected by Benedict Balansa (no. 2090) in damp places near Assomption, Paraguay, in March, 1875, and is deposited in the Delessert Herbarium at Geneva. It has been confused with C. myrianthum Cham. by early herbarium workers. Briquet, in the reference listed above, says: "La distinction établie par Schauer (in Prodr. XI, 609) entre les espèces à grappes pendantes et à grappes érigées est purement artificielle. Ce Citharexylum possède des grappes incurvées-nutantes comme le C. myrianthum, dont il est très voisin. Il s'en distingue par ses feuilles plus rigides, très lisses et luisantes en dessus, glabres ou presque glabres en dessous, plus petites, non acuminées, mais mutiques au sommet. Nous avons longtemps hésité à considérer le C. rigidum comme une espèce distincte du C. myrian-

thum, dont les formes n'ont guère été distinguées jusqu'à présent. Nous préférons cependant présenter provisoirement ces deux plantes comme des variétés, parce qu'une revue de l'ensemble des matériaux existant mettrait sans aucun doute en évidence l'existence de formes intermédiaires."

Balansa says that the racemes are pendent and the fruit fleshy. Compared with other species, such as C. caudatum L., for instance, which are very fleshy, the fruits on this plant seem to be almost fleshless. When they are dry only a very thin layer covers the bony endocarp. Its very light-gray branches and branchlets, its stramineous or even yellowish twigs, and the rather variable leaf arrangement are noteworthy. Its very decidedly gray-green leaf coloration on herbarium material distinguishes it at once from C. myrianthum.

Reineck reports it as rare in thickets near São Pedro and in river thickets of the Rio Guahyba towards Novegantes in Rio Grande do Sul. He misidentified it as "Citharexylon quadrangulare L." [Citharexylum spinosum L.]. Osten, in this connection, has placed a very interesting note on the February 14th specimen in the Montevideo herbarium: "Reineck ist ein Schwindler. Er hat mir eben zweite Collection Pflanzen angeblich von Brasil, Rio Grande, verkauft, die sicher z. Theil nicht von dort stammen, also falsch Etiketten haben....Osten."

In all, 18 herbarium specimens, including the type of all the names involved, and 7 mounted photographs have been examined.

Citations: BRAZIL: Rio Grande do Sul: Reineck s.n. [Porto Alegre, Feb. 14, 1898; Herb. Osten 5045] (N, Ug), s.n. [Porto Alegre, 4/XII/98] (N—photo, Ol, Z—photo). PARAGUAY: Balansa 2090 (B—isotype, B—isotype, B—photo of isotype, Br—isotype, Cb—type, F—976845—isotype, K—isotype, K—photo of isotype, L—isotype, Lu—isotype, N—isotype, N—isotype, N—photo of isotype, P—isotype, P—isotype, S—isotype, S—photo of isotype, X—isotype, X—isotype, Z—photo of isotype).

CITHAREXYLUM RIMBACHII Moldenke, Phytologia 1: 443--444. 1940.

Literature: Moldenke, Phytologia 1: 443--444. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 88. 1942; Salisb., Ind. Kew. Suppl. 10: 53. 1947; H. N. & A. L. Moldenke, Plant Life 2: 79. 1948; Moldenke, Alph. List Cit. 3: 857. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 179. 1949; Moldenke, Résumé 79 & 447. 1959.

Middle-sized forest tree with broad crown and thick, rather smooth bark exfoliating in longitudinal strips; branches and branchlets very stout and robust, hollow, brown, decidedly tetragonal, much flattened at the nodes, pulverulent-puberulent, usually decidedly corky-margined below the nodes; nodes annulate, the annulation deeply U-shaped (at least on one side); leaves decussate-opposite; petioles very stout, 3.5--4 cm. long, flattened above, ridged in drying, ampliate at the base, puberulent; leaf-blades very large, coriaceous, oval or ovate, 25--30 cm.

long, 15--19 cm. wide, dark-green above, somewhat lighter beneath, acute at the apex, entire, subtruncate at the base (rarely abruptly acute), glabrous above, densely appressed-tomentose beneath with yellowish many-branched hairs; midrib very stout, slightly impressed above, very prominent and merely puberulent beneath; secondaries strong, 11--16 per side, arcuate-ascending, very slightly impressed above, very prominent beneath with the pubescence wearing off on the most elevated portions; vein and veinlet reticulation abundant, only the coarsest portions prominent beneath, only the finest portions (!) visible above; inflorescence axillary, spicate; spikes opposite, solitary, 13--21 cm. long, about 2 cm. wide during anthesis, densely many-flowered; peduncles stout, 2.5--3 cm. long, densely furfuraceous-tomentose with cinereous hairs, angulate in drying; rachis stout, thicker than the peduncle, more densely cinereous-tomentose with longer hairs than the peduncles; bracts and bractlets none; prophylla conspicuous (especially when the calyxes have dropped off), reflexed, 1.5--2 mm. long, densely tomentose, linear-subulate; pedicels none; calyx during anthesis very large and heavy, more or less inflated, 5.5--7 mm. long, tubular or broadly cupuliform to urceolate, densely short-tomentose, often 5-costate with darker or less pubescent lines, its rim 5-toothed, the teeth broadly triangular, about 1 mm. long, acute at the apex; corollas not seen; immature fruiting-calyx decidedly urceolate, almost enclosing the fruit, very decidedly inflated, with the 5 dark costae very conspicuous; immature fruit globose.

The type of this outstanding species was collected by August Rimbach (no. 374) in the forested region between Río Chimbo and the village of Balsapampa, in the Western Cordillera, at an altitude of 2500 meters, Los Ríos, Ecuador, in December, 1934, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The collector notes that only the young twigs are hollow, that the calyx is fleshy and greenish, that the corolla is white and has 5 or 6 segments, that there are 5 anthers, and 1 short style. The species is apparently closely related to *C. montanum* Moldenke and *C. subflavescens* Blake. It is thus far known only from the type collection. In all, 2 herbarium specimens, including the type, and 2 mounted photographs have been examined.

Citations: ECUADOR: Los Ríos: Rimbach 374 (N--isotype, N--photo of type, S--type, Z--photo of type).

CITHAREXYLUM ROSEI Greenm., Field Columb. Mus. Publ. Bot. 2: 260. 1907.

Literature: Greenm., Field Columb. Mus. Publ. Bot. 2: 260. 1907; Prain, Ind. Kew. Suppl. 4: 49. 1913; Moldenke, Alph. List Common Names 10. 1939; Moldenke, Geogr. Distrib. Avicenn. 13. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 88. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 307. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 79. 1948; Moldenke, Alph. List Cit. 2: 423 & 499 (1948), 3: 834, 872, & 883 (1949), and 4: 1028 & 1031. 1949; Moldenke, Known

Geogr. Distrib. Verbenac., [ed. 2], 29 & 179. 1949; Moldenke, Résumé 35 & 447. 1959.

Shrub or small tree, to 2.5 m. tall, with the aspect of a species of Lycium; branches and branchlets medium or slender, woody, stiff, blackish, obtusely tetragonal, very minutely puberulent or glabrate, sparsely light-lenticellate; twigs slender, very light-gray, rather sharply tetragonal and ribbed, densely incanous-puberulent; nodes very obscurely annulate, thickened; principal internodes 0.4--4.9 cm. long, mostly much abbreviated; leaf-scars very small, borne on very small and inconspicuous sterigmata or subsessile; leaves decussate-opposite, crowded on very young twigs; petioles very slender, 1--2 mm. long or almost obsolete, densely incanous-short-pubescent; leaf-blades chartaceous when mature, uniformly grayish-green on both surfaces, elliptic-oblong, 1--3 cm. long, 4--9 mm. wide, abruptly acute at the apex, entire and revolute along the margins in drying when mature, cuneate at the base and prolonged into the petiole, not glanduliferous, puberulent-scabrellous above, densely incanous-short-pubescent beneath, more or less incanous-pubescent on both surfaces when immature; midrib very slender, more or less impressed above, slightly prominulent beneath; secondaries several pairs, very obscure; vein and veinlet reticulation indiscernible; racemes axillary or terminating extremely short axillary twigs, less than 2 cm. long, few-flowered, simple; peduncles and rachis very slender, abbreviated or subobsolete, incanous-pubescent; pedicels slender, about 1 mm. long during anthesis, elongate to 5 mm. in fruit, densely incanous-short-pubescent; bracts and bractlets absent, or, if present, few and leaf-like; prophylla not obvious; flowers not seen; fruiting-calyx light and herbaceous, very shallowly cupuliform or patelliform, 2--2.5 mm. long and 6 mm. wide, short-pubescent, its rim truncate and subentire or 4-angulate; fruit drupaceous, oblong, fleshy, 7--8 mm. long, about 7 mm. wide when mature, greatly wrinkled in drying, nigrescent and 2-sulcate in drying, glabrous, shiny; pyrenes elliptic, 6--7 mm. long, concavo-convex, strongly corrugated on the outer or convex surface.

The type of this species was collected by Joseph Nelson Rose, Joseph Hannum Painter, and Joseph Sims Rose (no. 9827) near San Pablo, Querétaro, Mexico, on August 24, 1905, and is deposited in the United States National Herbarium at Washington. It is named in honor of Joseph Nelson Rose [not "John Nelson Rose... and his son" as stated in Pl. Life 2: 79. 1948]. The Altamirano specimen cited below is anomalous in having glabrous twigs and glabrate leaves and fruiting-calyxes, but in all other respects it agrees well with the type material. For it the common name "del ciervo á Sn. Juan" has been recorded. The Rusby collection is very immature, being only in bud, and this probably accounts for its very tiny, thin, flat, and crowded leaves. In the characters of its branches, branchlets, and twigs it matches the type collection precisely.

Greenman notes that the species resembles C. altamirantum Greenm., "to which it is closely related, but from which it dif-

fers amply in having smaller leaves of different outline, a more dense tomentum, and in its shorter, shallower, and truncate calyx and corrugated pyrenae." Gentry found the species in reddish-brown clay-loam derived from igneous rocks, among rocks in oak-juniper grasslands, at altitudes of 2400 to 2500 meters, fruiting in September. In all, 11 herbarium specimens, including the type, and 7 mounted photographs have been examined.

Citations: MEXICO: Durango or Zacatecas: H. S. Gentry 8564 (W-2022214). Guanajuato: H. H. Rusby 43 (W-5745510). Querétaro: Altamirano 1761 (N, W-570774); Rose, Painter, & Rose 9827 (B-photo of type, E-717430-photo of type, F-195707-isotype & photo of type, K-photo of type, N-isotype, N-photo of type, S-photo of type, W-453317-type, Z-photo of type), 9828 (N, N, W-453318). San Luis Potosí: Purpus 5047 (Ca-153348).

CITHAREXYLUM ROSEI var. DURANGENSE Moldenke, Phytologia 2: 14 [as "durangensis"]. 1941.

Synonymy: Rauwolfia lycioides Cav., Anal. Cienc. Nat. 5: 69-70. 1802.

Literature: Cav., Anal. Cienc. Nat. 5: 69-70. 1802; Jacks., Ind. Kew. 2: 693. 1895; Moldenke, Phytologia 2: 14. 1941; J. A. Clark, Card Index issue 172. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 88 (1942) and [ed. 2], 29 & 179. 1949; Moldenke, Alph. List Cit. 3: 933. 1949; Rao, Ann. Mo. Bot. Gard. 43: 347. 1956; Moldenke, Résumé 35, 258, & 447. 1959.

This variety differs from the typical form of the species in having its leaf-blades only very minutely and obscurely puberulent on both surfaces with very short appressed grayish hairs.

The type of the variety was collected by my friend and colleague, Forrest Shreve (no. 9122), on outwash plains near Pasaje, at an altitude of 4650 feet, Durango, Mexico, on August 23, 1939, and is deposited in his herbarium at Tucson, Arizona. He describes the plant as a shrub 6 feet tall, with its mature fruit red in color. Gentry found it common in chaparral in rocky soil, at an altitude of 1700 meters, fruiting in September. He calls it a chaparral shrub. It is possible that the glabrate Altamirano specimens cited under C. rosei Greerm. may rather belong here.

The type of Rauwolfia lycioides was taken from a cultivated plant growing in the Royal Botanic Garden at Madrid on June 17, 1801, from seeds secured in Nueva España [probably somewhere in Mexico] before 1800, where it is said to be called "cacao blanco". It is very possible that it belongs in the synonymy of C. racemosum Sessé & Moc. rather than here. Only a photograph of the type has been seen by me.

In all, 3 herbarium specimens, including the type of the variety, and 3 mounted photographs have been examined.

Citations: MEXICO: Durango: H. S. Gentry 8286 (W-1978901); Shreve 9122 (Fs--type, N-isotype, N-photo of type, Z-photo of type). CULTIVATED: Spain: Herb. Hort. Bot. Matrit. s.n. (Z--

photo).

CITHAREXYLUM SCABRUM Sessé & Moc. ex D. Don, Edinb. New Philos. Journ. 11 [Jan.—Mar.]: 238. 1831 [not C. scabrum Willd., 1832].

Synonymy: Citharexylum incanum Sessé & Moc. ex D. Don, Edinb. New Philos. Journ. 11 [Jan.—Mar.]: 238. 1831. Citharexylon incanum Sessé & Moc. apud Walp., Repert. 4: 73—74. 1845. Citharexylon scabrum Moc. & Sessé apud Walp., Repert. 4: 74. 1845.

Citharexylum scabrum Moc. & Sessé apud Schau. in A. DC., Prodr. 11: 614. 1847. Citharexylum cinaloanum B. L. Robinson, Bot. Gaz. 16: 342. 1891. Citharexylum incanum Moc. & Sessé apud Jacks., Ind. Kew. 1: 550. 1893. Cytarexylon scabrum Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 24, in syn. 1940. Cytarexylon scatrum Sessé & Moc. ex Moldenke, Suppl. List Invalid Names 3, in syn. 1941.

Literature: D. Don, Edinb. New Philos. Journ. 11 [Jan.—Mar.]: 238. 1831; Walp., Repert. 4: 73—74. 1845; Schau. in A. DC., Prodr. 11: 614. 1847; B. L. Robinson, Bot. Gaz. 16: 342. 1891; Jacks., Ind. Kew. 1: 549—550. 1893; T. S. Brandeg., Zoe 5: 219. 1900; Greenm., Field Columb. Mus. Publ. Bot. 2: 259—260. 1907; Hill, Ind. Kew. Suppl. 6: 47. 1926; Moldenke, Geogr. Distrib. Avicenn. 13. 1939; Moldenke, Alph. List Common Names 17 & 24. 1939; Moldenke, Prelim. Alph. List Invalid Names 16 & 24. 1940; Moldenke, Suppl. List Invalid Names 3. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 88. 1942; Moldenke, Alph. List Invalid Names 14 & 22. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 57, 192, 241, 242, 273, 309, & 311 (1946), 2: 334, 339, 419, 421, 465, 472, & 498 (1948), 3: 788, 829, 870, 873, & 926 (1949), and 4: 1019, 1024, 1030, 1032, 1040, & 1051. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 179. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 4. 1949; Moldenke, Résumé 35, 253—256, 258, 277, & 447. 1959.

Rather slender bush, shrub, or tree, to 4 m. tall; stem to 10 cm. in diameter; branches and branchlets medium, rather acutely tetragonal, light-brown or grayish, very minutely puberulous or glabrescent; twigs slender, grayish-brown, rather densely short-pubescent or becoming glabrescent; nodes obscurely annulate; principal internodes 1—4.5 cm. long; leaves decussate-opposite or approximate; leaf-scars often borne on stoutish, divergent, corky sterigmata to 5 mm. long; petioles very slender, 6—20 mm. long, shortly pilose-pubescent; leaf-blades very firmly chartaceous, dark-green or (usually) grayish-green, oblong or oblong-lanceolate to elliptic or ovate, sometimes obovate, 2.5—10.5 cm. long, 0.8—5.5 cm. wide, acute or short-acuminate at the apex, coarsely and irregularly dentate along the margins (except at the apex and base, rarely dentate also at the apex) with large and broad-based triangular teeth, often merely angulate or sinuate to subentire or entire, acuminate or subcuneate at the base, very scabrous above, rather densely short-pubescent beneath, beauti-

fully reticulate, usually bearing a pair of very small glands at the base; midrib slender, plane or subimpressed above, prominent beneath; secondaries very slender, 4--7 pairs, arcuate-ascending, slightly prominulent beneath; vein and veinlet reticulation fine, mostly rather obscure above and very slightly prominulent beneath; racemes axillary and terminal, erect or nutant, 4--45 cm. long, about 1 cm. wide, simple or irregularly compound with 1 or 2 pairs of branches, many-flowered; peduncles and rachis slender, densely short-pubescent, the former 6--15 mm. long; pedicels filiform, 2--3.5 mm. long, short-pubescent; bracts absent; bractlets few (or none), oblong and stipitate or linear, about 1 mm. long or less; prophylla minute, setaceous, about 1 mm. long; flowers often subsessile; calyx campanulate, about 2 mm. long, striate, pubescent, its rim 5-dentate, the teeth very short, acuminate at the apex, slightly spreading or recurved, not reflexed, equal or subequal to unequal with the anterior and posterior ones larger; corolla white, about 3 mm. long, pubescent externally and within, its lobes erect; fertile stamens 4; staminode 1, rudimentary; style glabrous; fruiting-calyx incrassate, indurate, cupuliform, about 3 mm. long and 6 mm. wide, minutely puberulent, its rim shallowly and more or less irregularly erose; fruit oblong, about 6 mm. long, 4--5 mm. wide, fleshy, glabrous, shiny, black and wrinkled in drying.

The type of this species was collected by Martín Sessé y Lacasta, José Mariano Mociffo, Juan Diego del Castillo, and José Maldonado (no. 2369) somewhere in Mexico in or before 1831 and is deposited in the herbarium of the Jardín Botánico at Madrid. The type of C. incanum was gathered by the same collectors (no. 2367), also somewhere in Mexico in or before 1831 and is also deposited at Madrid. The type of C. cinaloanum was collected by William Greenwood Wright (no. 1225) at Mazatlan and vicinity, Sinaloa, Mexico, in December, 1888, and is deposited in the Gray Herbarium at Harvard University. The latter represents the small-leaved form of the species. The large-leaved and long-inflorescenced form is usually identified as C. incanum, but all manner of intermediate specimens occur.

The species is exceedingly variable in leaf-size and -shape and in the length of the racemes, but it may always be recognized by the scabrous upper leaf-surface. Common names recorded for it are "jito siropo", "panothillo", and "salacate". Endlich reports that the fruits are eaten by birds. It has been collected in anthesis in April, July, September, October, and December, and in fruit in March, April, August to October, and December. It inhabits wet soil, hedgerows, and thickets along riverbanks. Wright reports that the foliage when fresh is "whitish".

The Pringle specimen cited below is a mixture, probably representing another collection entirely. The Ortega 927, also cited below, is from Rosario, Cacalotan, and may be either from Nayarit or Sinaloa.

The species has been confused in herbaria with C. berlandieri B. L. Robinson and C. reticulatum H.B.K., as well as with the

genus Cordia in the Ehretiaceae. Robinson says that it is closely related to C. berlandieri, "but differing in its larger, usually more acuminate leaves, its campanulate rather than turbinate calyx with acute instead of blunt lobes, in the erect lobes of the corolla, and the glabrous style; the corolla-lobes in C. berlandieri being larger and more spreading and the upper part of the style puberulent." He also says "The affinity of C. cinaloanum is in all probability with the obscure C. scabrum Moc. & Sessé, and it may eventually prove to be conspecific. The leaf-margins on an individual plant often vary from entire to conspicuously dentate in the apical portion; and the inflorescence, here as in several other species of the genus, may be either simple or compound."

In all, 60 herbarium specimens, including the types of all the names involved, and 13 mounted photographs have been examined.

Citations: MEXICO: Baja California: T. S. Brandegee s.n. [Miraflores] (A, Ca--104981, Ca--104982, G, N, Po--63505, Po--71176, W--873665). Nayarit: J. Gonzalez Ortega 927 (Me). San Luis Potosí: Pringle 3222b (Ca--104980). Sinaloa: T. S. Brandegee s.n. [Culiacan, Sept. 14] (Ca--104984), s.n. [Culiacan, Oct. 12] (Ca--104983); Endlich 714 (B); J. Gonzalez Ortega 4734 (W--1268430), 5517 (D--651076, G, K, W--1207558), 6410 (Cp, D--650730, Du--170424, G, Gg--160853, Mu, N--photo, W--1269657, Z--photo), 6923 (F--709194, Gg--202813); Edw. Palmer 1523 (Cp, F--707753, Fs, G, G, Mi, S, W--305274, W--567742, W--567743); J. N. Rose 1858 (F--216151, G, W--300741), 3269 (F--216152, W--302244); Rose, Standley, & Russell 13397 (E--895196, N, W--636222), 14949 (E--895234, G, W--637825); W. G. Wright 1225 (B--photo, Ca--25099, Du--90903, E--119051, F--267510, G, K--photo, N--photo, S--photo, W--42712, X, Z--photo). State undetermined: Sessé, Mocillo, Castillo, & Maldonado 2367 (F--849578, It--photo, N--photo, Q, Z--photo), 2369 (F--851474--isotype, N--isotype, N--photo of type, Q--type, S--photo of type, Z--photo of type).

CITHAREXYLUM SCHOTTII Greenm., Field Columb. Mus. Publ. Bot. 2: 190. 1907.

Synonymy: Citharexylum quadrangulare Millsp. apud Greenm., Field Columb. Mus. Publ. Bot. 2: 190, in syn. 1907 [not C. quadrangulare L., 1786, nor Sessé & Moc. 1831 and 1894, nor Schau., 1864, nor Boutelou, 1909, nor Griseb., 1909, nor Jacq., 1909, nor A. Rich., 1909, nor Hort., 1911, nor Citharexylon quadrangulare Jacq., 1760]. Citharexylon schottii Greenm., in herb.

Literature: Millsp., Field Columb. Mus. Publ. Bot. 1: 386. 1898; Greenm., Field Columb. Mus. Publ. Bot. 2: 190. 1907; Prain, Ind. Kew. Suppl. 4: 49. 1913; Standl., Field Mus. Publ. Bot. 3: 400. 1930; Moldenke, Geogr. Distrib. Avicenn. 14 & 36. 1939; Moldenke, Alph. List Common Names 8. 1939; Moldenke, Prelim. Alph. List Invalid Names 17. 1940; Moldenke, Suppl. List Common

Names 10, 16, 22, & 24. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 192--193. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16, 71, & 88. 1942; Moldenke, Alph. List Invalid Names 15. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 227, 228, 299, 300, 307, 315, 316, & 318. 1946; Moldenke, Phytologia 2: 330--331. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 82. 1948; Moldenke, Alph. List Cit. 2: 329, 330, 334, 352, 356, 357, 419, 426, 447, 460, 502, & 565 (1948), 3: 679, 907, 964, & 965 (1949), and 4: 1020, 1031, 1053, 1186, 1187, 1232, & 1239. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29, 39, 158, & 179. 1949; Moldenke, Phytologia 3: 465. 1951; Moldenke, Résumé 35, 46, 215, 254, 258, & 447. 1959.

Arborescent shrub, treelet, or tree, to 10 m. tall; trunk to 5 cm. in diameter; stems covered with gray bark and dotted with numerous lenticels; branches and branchlets acutely tetragonal and ribbed, brown or brownish, minutely pulverulent or glabrate, the branchlets and twigs medium or slender; nodes obscurely annulate; principal internodes 2--5.5 cm. long; leaf-scars small, borne on very small and short sterigmata; leaves decussate-opposite (or approximate on vigorous shoots); petioles very slender, 7--20 mm. long, glabrous; leaf-blades chartaceous, dark-green above, brunescent or nigrescent in drying, lighter beneath, dull, lanceolate-oblong or narrowly oblong-elliptic, 3.3--10.5 cm. long, 2--3 cm. wide, acute or acuminate at the apex, entire, acuminate at the base and attenuate into the petiole, usually with a pair of small black glands at the very base, glabrate on both surfaces; midrib slender, prominent beneath; secondaries very slender and delicate, 5--7 pairs, arcuate-ascending, slightly prominent on both surfaces; vein and veinlet reticulation fine, mostly obscure; racemes axillary and terminal, numerous, erect or nutant, simple or compound with 1 or 2 pairs of branches, mostly short, 3--9.5 cm. long, about 1 cm. wide, many-flowered; peduncle and rachis slender, glabrous or subglabrate, nigrescent, the former 4--11 mm. long; pedicels filiform, 1--1.5 mm. long, glabrate, to 3 mm. long in fruit; bracts large and leaf-like or (usually) absent; bractlets linear, 5 mm. long or longer; prophylla setaceous-subulate, about 1 mm. long; calyx tubular-campanulate, about 2.5 mm. long, 5-angled in cross-section, its rim sinuately 5-dentate; corolla about twice as long as the calyx, pale yellow-green or pale-green, externally glabrous or essentially so, pubescent in the throat within, its tube surpassing the calyx, obconic, the lobes oblong-rotund, pubescent on the inner surface, ciliolate; fruiting-calyx cupuliform, about 3 mm. long and 5.5 mm. wide, usually nigrescent, very minutely puberulent or glabrous and shiny, its rim subtruncate, subentire or 5-angulate; fruit oblong or oblong-obovate, 5--7 mm. long, about 4 mm. wide, rather fleshy, wrinkled and nigrescent in drying and deeply 2-sulcate.

The type of this characteristic species was collected by Arthur Carl Victor Schott (no. 575) at Mérida, Yucatán, Mexico, on July 28, 1865, and is deposited in the herbarium of the Chicago Natural History Museum. The species has been confused by

herbarium workers and misidentified by them as C. caudatum L., C. integerrimum (Kuntze) Moldenke, C. subserratum Sw., Cytherexilum cinereum Sessé & Moc., Clerodendrum sp., and even as possibly a member of the Ehretiaceae. It has been collected in forests, young legume thickets, dooryards, and second growth on lake shores, in anthesis from May to August and in November, and in fruit in November. Gaumer describes it as common at Izamal, Yucatán. It is remarkably constant in its characters, the nigrescent leaves and racemes and the numerous short racemes characterize it well.

Greenman states that the species differs from C. quadrangulare Jacq. [= C. spinosum L.] "in its more profuse inflorescences, smaller fruit, etc. Superficially C. schottii resembles C. glabrum Greenm., but from this species again it differs in having the spicate branches of the panicle erect or ascending, and in having also a proportionately shorter corolla-tube, and the lobes of the corolla glabrous or essentially so on the outer surface."

Standley, in the reference listed above, records the vernacular names "iximche", "palo de violín", and "tatakche", and comments that "The 'ixtatakche' listed by Pérez is probably a different plant. It is described as a 'herba', and is said to be applied to old sores to heal them." Steere records the name "chacni-bach" for his specimen no. 1337, while the Lundells list "xchobenche" on the label of their no. 7878. Millspaugh, in the work listed above, cites Schott 89 under "Citharexylum quadrangulare Jacq." from Mérida, but according to notes on the British Museum specimen of this number, this collection is from Havana, Cuba, and examination proves it to be C. fruticosum var. subvillosum Moldenke, a form not known from the Yucatán area. The two Schott s.n. specimens, however, cited below, are from the type locality of C. schottii.

In all, 84 herbarium specimens, including the types of all the names involved, and 5 mounted photographs have been examined.

Citations: MEXICO: Quintana Roo: G. F. Gaumer 1944 (B, E--954110, F--58742, N, S, W--1267531); Lundell & Lundell 7781 (Mi, Mi, N). Yucatán: G. F. Gaumer 765 (A, B, Bm, Br, Ca--446261, Cp, D--763211, Du--206186, E--15, Gg--160785, I, K, Lu, Mi, N, S, V--10655, W--571769), 765 bis (F--36568, F--58012--fruit, F--437594), 23163 (F--437557), 23466 (V--10646), 24037 (Bm, Cb, Cp, E--951563, F--552039, N, S, W--1268134); Gaumer & sons 23463 (Cb, E--953730, F--460221, N, W--1267773); Lundell & Lundell 7878 (Mi, Mi, N), 8132 (Ld, Mi, Mi, N); A. C. V. Schott 575 (B--photo of type, Bm--isotype, Br--isotype, E--119063--isotype, F--195495--type, K--photo of type, N--photo of type, S--photo of type, Z--photo of type), s.n. [VIII.25.1865] (W--57330), s.n. [IX.22.1865] (W--57329); Steere 1337 (E--1087172, F--668647, I, La, Me, Me, Mi, S), 1419 (F--668591, F--698545, Mi, Mi), 1660 (F--668590, Mi), 7161

(Me). State undetermined: Herb. Fischer s.n. (L, L, L). COSTA RICA: Alajuela: Brenes 15532 [49] (N). CULTIVATED: France: Herb. Hort. Paris s.n. [Jul. 1825] (L, L). Italy: Herb. Harvey s.n. [h. R. P., h. f. 1844] (Du--166407). Java: Huitema s.n. [30-9-1942] (Bz--18720); Lam 3836 (Bz--18721). Locality of collection undetermined: Herb. Harvey s.n. (Du--166408). LOCALITY OF COLLECTION UNDETERMINED: Herb. Harvey s.n. (Du--166404, in part).

CITHAREXYLUM SCHULZII Urb. & Ekm. ex Urb., Arkiv Bot. 22a, no. 17: 108. 1929.

Literature: Urb., Arkiv Bot. 22a, no. 17: 108. 1929; Hill, Ind. Kew. Suppl. 8: 53. 1933; Moldenke, Geogr. Distrib. Avicenn. 7. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 26 & 88. 1942; Moldenke, Alph. List Cit. 1: 188 & 189. 1946; Moldenke, Phytologia 2: 384. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 82. 1948; Moldenke, Alph. List Cit. 2: 570 (1948) and 4: 1054 & 1066. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 47 & 179. 1949; Moldenke, Résumé 56 & 447. 1959.

Shrub, to 1.8 m. tall; branches heavy, woody, rigid; branchlets and twigs slender, obtusely or acutely tetragonal, gray or brownish, lenticellate, furfuraceous-puberulent; nodes annulate; principal internodes 0.7--7.4 cm. long; leaf-scars large, borne on large, heavy, divergent-ascending, corky sterigmata to 3 mm. long; leaves decussate-opposite; petioles stout, ampliate at the base, 4--6 mm. long, furfuraceous-puberulent; leaf-blades heavy-coriaceous, light-green on both surfaces, rather shiny above, oblong-elliptic or subobovate, 2--4 cm. long, 8--25 mm. wide, rounded and emarginate or subapiculate at the apex, entire and slightly subrevolute along the margins, acute at the base and often slightly asymmetric there, bearing a pair of black glands at the very base, glabrate and roughened (but not scabrous!) above, densely short-pubescent beneath; midrib strong throughout its length, subimpressed above, very prominent beneath; secondaries slender, 3--6 pairs, subimpressed or obscure above, irregular, very prominent beneath; vein and veinlet reticulation abundant, indiscernible above, very prominent to the last detail beneath; racemes axillary or terminal, abbreviated, 1--2 cm. long, about 1 cm. wide, many-flowered, dense, simple, erect; peduncles and rachis rather stout and heavy, densely brown-pubescent, the former extremely much abbreviated; pedicels stoutish, about 1 mm. long, densely pubescent; bracts and bractlets none; prophylla setaceous, about 1 mm. long, pubescent; corolla white; fruit red.

The type of this very distinct species was collected by Erik Leonard Ekman (no. H.7654) on the slope towards Camp-Franc, Croix-des-Bouquels Badeau, Massif de la Selle, Haïti, at an altitude of about 1300 meters, on February 22, 1927, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The collector describes the plant as rare.

It is one of the most unmistakable members of the entire genus because of its small coriaceous leaf-blades and the pronoun-

cedly prominent vein-reticulation on the under surface after the manner of that seen in Callicarpa cubensis Urb. and C. crassiner-vis Urb. It inhabits the rocky slopes of gulches and limestone areas in pine woods. It has been collected in anthesis in January and February, and in fruit in August, at altitudes of 1300 to 1400 meters. It is named in honor of Otto Eugen Schulz (1874—1936), distinguished German taxonomist. In all, 14 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: HISPANIOLA: Dominican Republic: Howard & Howard 8252 (N, N, S). Haiti: Ekman H.3131 (B, N, S, S), H.7654 (B—iso-type, B—photo of type, N—iso-type, N—iso-type, N—photo of type, N—photo of type, S—type, S—iso-type, W—1304030—iso-type, W—1479666—iso-type, Z—photo of type).

CITHAREXYLUM SESSAEI D. Don, Edinb. New Philos. Journ. 11 [Jan.—Mar.]: 238. 1831.

Synonymy: Citharexylum quadrangulare Sessé & Moc. ex D. Don, Edinb. New Philos. Journ. 11 [Jan.—Mar.]: 238, in syn. 1831 [not C. quadrangulare L., 1786, nor Hort. Madrit., 1845, nor Schau., 1864, nor Sessé & Moc., 1894, nor Millsp., 1907, nor Boutelou, 1909, nor Griseb., 1909, nor Hort., 1911, nor Jacq., 1909, nor A. Rich., 1909, nor Citharexylon quadrangulare Jacq., 1760].

Citharexylon quadrangulare Moc. & Sessé ex Walp., Repert. 4: 75, in syn. 1845. Citharexylum quadrangulare Moc. & Sessé ex Schau. in A. DC., Prodr. 11: 614, in syn. 1847. Citharexylum sessaei Don ex Moldenke, Alph. List Invalid Names Suppl. 1: 5, in syn. 1947. Citharexylon sessei D. Don ex Moldenke, Résumé 254, in syn. 1959.

Literature: D. Don, Edinb. New Philos. Journ. 11 [Jan.—Mar.]: 238. 1831; Walp., Repert. 4: 75. 1845; Schau. in A. DC., Prodr. 11: 614. 1847; Jacks., Ind. Kew. 1: 550. 1893; Velenovsky, Vergl. Morphol. Pfl. 2: 492. 1907; Stapf, Ind. Lond. 2: 220. 1930; Moldenke, Geogr. Distrib. Avicenn. 14. 1939; Moldenke, Prelim. Alph. List Invalid Names 17 & 24. 1939; Moldenke, Alph. List Invalid Names 15 & 23. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 88. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 5. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 83. 1948; Moldenke, Alph. List Cit. 2: 339 & 543 (1948), 3: 659, 660, & 926 (1949), and 4: 1208. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 179. 1949; Moldenke, Phytologia 3: 284. 1950; Moldenke, Résumé 35, 254, 258, & 447. 1959.

Illustrations: Velenovsky, Vergl. Morphol. Pfl. 2: 492. 1907.

Small tree, to almost 5 m. tall; bark fairly smooth, with vertical cracks, the color often obscured by lichens; branches tetragonal; leaves ovate, 4—7.5 cm. long, thin-membranous, acuminate at the apex, entire, subacute or rather obtuse to rounded at the base, glabrescent above in age (pubescent when immature), persistently pubescent beneath, pinnately veined; racemes spiciform, elongate, to 21 cm. long, nutant.

The type of this puzzling and little-known species was collected by Martín Sessé y Lacasta, José Mariano Mociffo, Juan Diego del Castillo, and José Maldonado (no. 2273) in Michoacán, Mexico, and is deposited in the herbarium of the Jardín Botánico at Madrid. It has been collected in fruit in June. In all, 3 herbarium specimens, including the types of all the names involved, and 2 mounted photographs have been examined. The species is very close to C. ovatifolium Greenm., and the two may eventually prove to be conspecific. Don states that it is related to C. pulverulentum Pers. [= C. pentandrum Vent.] and to C. quadrangulare Jacq. [= C. spinosum L.], while Schauer maintains that it is closest to C. villosum Jacq. [= C. fruticosum var. villosum (Jacq.) O. E. Schulz].

Citations: MEXICO: Michoacán: Sessé, Mociffo, Castillo, & Maldonado 2273 (N--photo of type, Q--type, Z--photo of type). San Luis Potosí: R. J. Newman 23 (W--1949106). LOCALITY OF COLLECTION UNDESIGNATED: Collector undesignated 56, in part (Q).

CITHAREXYLUM SHREVEI Moldenke, Geogr. Distrib. Avicenn. 14, nom. nud. (1939); Phytologia 1: 415. 1940.

Literature: Moldenke, Geogr. Distrib. Avicenn. 14. 1939; Moldenke, Phytologia 1: 415. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 88. 1942; Salisb., Ind. Kew. Suppl. 10: 53. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 83. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 179. 1949; Moldenke, Alph. List Cit. 3: 698. 1949; Moldenke, Résumé 35 & 447. 1959.

Shrub; branches and branchlets slender, gray, subterete; twigs extremely slender and terete, white or very light-gray, minutely puberulent with very short albidous hairs, obtusely tetragonal; principal internodes 0.4--2.5 cm. long; nodes not annulate; leaves decussate-opposite; petioles very slender, less than 1 mm. long or obsolete; leaf-blades chartaceous, gray-green on both surfaces, narrowly oblong or elliptic, 0.4--2.2 cm. long, 2.5--5.5 mm. wide, bluntly acute or obtuse at the apex, entire and usually more or less revolute along the margins, acute or subcuneate at the base, strigillose-roughened on both surfaces with minute albidous bulbous-based hairs; midrib very slender, very slightly prominent beneath; secondaries about 3 per side, very slender, usually indiscernible above and obscure beneath; vein and veinlet reticulation indiscernible; inflorescence and fruit not known.

The type of this species was collected by Daniel Trembly Mac Dougal and Forrest Shreve (no. 59) at Picu Pass, Sonora, Mexico, on November 19, 1923, and is deposited in the United States National Herbarium at Washington. It is named in honor of Dr. Forrest Shreve, who has contributed so much to our knowledge of the flora and ecology of the southwestern portion of the United States and of Mexico. The species is obviously related to C. brachyanthum (A. Gray) A. Gray and to C. lycioides D. Don. Thus far it is known only from the type collection. In all, 2 herbarium specimens, including the type, and 2 mounted photographs

have been examined.

Citations: MEXICO: Sonora: MacDougal & Shreve 59 (N--isotype, N--photo of type, W--1167133--type, Z--photo of type).

CITHAREXYLUM SOLANACEUM Cham., Linnaea 7: 119--120. 1832.

Synonymy: Citharexylon solanaceum Cham. apud Steud., Nom. Bot., ed. 2, 1: 375. 1840.

Literature: Cham., Linnaea 7: 119--120. 1832; Steud., Nom. Bot., ed. 2, 1: 375. 1840; Walp., Repert. 4: 76. 1845; Schau. in A. DC., Prodr. 11: 613. 1847; Schau. in Mart., Fl. Bras. 9: 268. 1851; Jacks., Ind. Kew. 1: 550. 1893; Glaz., Bull. Soc. Bot. France Mém. 3: 545. 1911; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Prelim. Alph. List Invalid Names 15. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 88. 1942; Moldenke, Alph. List Invalid Names 13. 1942; Moldenke, Alph. List Cit. 1: 170, 171, 226, & 238. 1946; Augusto, Fl. Rio Grande do Sul 229 & 236. 1946; Moldenke, Alph. List Cit. 2: 428 (1948), 3: 921--923 (1949), and 4: 1066. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 76 & 179. 1949; Moldenke, Phytologia 3: 134. 1949; Stellfeld, Trib. Farmac. 19 (10): 169. 1951; Rambo, Anais Bot. Herb. Barbosa Rod. 3: 72. 1951; Rambo, Sellowia 7: 288. 1956; Moldenke, Résumé 88, 254, 258, & 447. 1959.

Shrub or tree, to 10 m. tall; branchlets slender, very obtusely tetragonal or subterete, gray, glabrate, unarmed; twigs slender, more or less tetragonal, very densely villous-tomentose with short fulvous hairs; nodes obscurely annulate; principal internodes 1--5 (mostly about 2.5) cm. long; leaf-scars borne on large divergent sterigmata to 3 mm. long; leaves decussate-opposite or subopposite; petioles rather stout, 1.2--3.5 cm. long, densely short-hirsute; leaf-blades chartaceous, dark-green above, lighter beneath, dull, lanceolate-oblong or elliptic-lanceolate to elliptic, 6--18 cm. long, 2.2--6.7 cm. wide, acute or acuminate at the apex, entire or with a few irregular angulate-apiculate teeth toward the apex, acute or cuneate at the base, very lightly pilosulous-pubescent or glabrescent above, densely hirsute-tomentose or velutinous-pubescent beneath, usually bearing a pair of elongate black crateriform glands parallel with the midrib at the very base; midrib slender or stoutish, prominent beneath; secondaries slender, 6--10 pairs, arcuate-ascending, plane or subimpressed above, prominent or prominent beneath; vein and veinlet reticulation abundant, obscure above, more or less prominent beneath (occasionally very conspicuously so); racemes axillary and terminal, spike-like, erect or nutant, simple or compound with a pair of basal branches, 4--20 cm. long, about 2 cm. wide during anthesis, very densely or very loosely many-flowered; peduncles and rachis slender, densely short-tomentose with fulvous hairs, the former 0.5--2 cm. long; pedicels very short and tomentose or obsolete; bracts and bractlets absent; prophylla setaceous or scale-like, longer than the pedicel, scarious, acute at the apex, densely tomentose; flowers very odorous; calyx firm, subtubular-cyathiform or urceolate-campumulate, 4--6 mm. long, tomentose externally and with-

in or merely sericeous within, its rim regularly 5-dentate, the teeth small, green, distant, acute and mucronate, the sinuses broad, rectilinear, pellucid-membranous; corolla white, hypocrateriform, 10—13 mm. long, its tube twice as long as the calyx, glabrous except for the villous throat, its limb 5-parted, subactinomorphic, expanded, 8—10 mm. wide, the lobes obovate, obtuse at the apex; stamens 5, slightly unequal; filaments short; anthers linear; style short, thick, much shorter than the calyx; stigma scarcely thickened; ovary obovate; fruiting-calyx large, incrassate, indurated, shallowly cupuliform, about 6 mm. long and 12 mm. wide, short-pubescent, not ribbed, its margin irregularly erose; fruit oblong, about 14 mm. long and 12 mm. wide, glabrous, not very fleshy, dull.

This very distinctive species was based on several collections of Friedrich Sellow (nos. 3104, 3241, 4988, and s.n.), made in "*Brasilia meridionalis*" and deposited in the herbarium of the Botanisches Museum at Berlin. Two distinct forms occur, one with very densely flowered racemes, and the other with very loose-flowered racemes. The dense-flowered form also has somewhat smaller flowers and was marked "*varietas*" by Chamisso on the original annotation labels. It was designated as *var. β* by Walpers. In pubescence, leaf-shape and -size, and all other respects, however, the two forms are identical.

The species inhabits primeval forests, woods, the margins of woodlands and thickets, from 30 to 1000 meters altitude. It has been collected in flower in November and December, and in fruit in February. Vernacular names recorded for it are "*taruma*" and "*tucamura*" — the former is a name applied to many species of the genus *Vitex* in South America; "*tarumá*" is applied to *C. montevidensis* (Spreng.) Moldenke. In all, 57 herbarium specimens, including the original cotypes, and 4 mounted photographs and paintings have been examined.

Citations: BRAZIL: Paraná: Dusén 7069 (B, Cb, E—1035937, N, S, W—1481820), 7850 (S), 13828 (B, Cb, N, S, W—1481819); Hatschbach 1591 (N), 3756 (Sm), 4219 (Ok). Rio de Janeiro: P. Clausen 1101 (N, P); Glaziou 17715 (B, Cp, K, P, P), 18393 (B, Br, Cb, Cp, K, L, N, P). Rio Grande do Sul: K. Emrich s.n. [4. III.1939] (N—painting); Gaudichaud 500 (N, P); Rambo 6559 (Rb), s.n. [28.1.1938] (S). Santa Catarina: Reitz 994 (S), C.163 (N), C.1709 (N); Smith & Klein 11932 (N, Ok). São Paulo: Lutz & Lutz 1844 (Z). State undetermined: Sellow 3104 (B—cotype), 3241 (B—cotype, K—cotype), 4988 (B—cotype, B—cotype, S—photo of cotype), s.n. [Brasilia] (Bm—cotype, Dc—cotype, K—cotype, L—cotype, N—cotype, N—photo of cotype, P—cotype, V—cotype, Vt—cotype, Z—photo of cotype), s.n. ["*varietas*"] (B, B, B, N).

CITHAREXYLUM SOLANACEUM var. INSOLITUM Moldenke in Fedde, Repert. 37: 233--234. 1934.

Literature: Moldenke in Fedde, Repert. 37: 233--234. 1934;

Moldenke, Geogr. Distrib. Avicenn. 36. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 71 & 88. 1942; Moldenke, Alph. List Cit. 1: 52 (1946) and 4: 1137. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 158 & 179. 1949; Moldenke, Résumé 215 & 447. 1959.

This variety differs from the typical form of the species in its more sharply and acutely tetragonal branchlets and twigs, its light-gray branches and branchlets, its merely puberulent twigs, its conspicuously annulate nodes, the scabrellous-strigillose upper leaf-surface and densely brown-short-pubescent lower leaf-surface, its larger and more corky sterigmata, and its midrib and secondaries being impressed above.

The type of the variety was collected from a cultivated plant growing in the Botanical Garden at Victoria, Cameroons, and is deposited in the herbarium of the Botanisches Museum at Berlin. It had been confused in herbaria with C. quadrangulare Jacq. and C. spinosum L. Dr. Hubert Winkler, who apparently first collected material from the type tree, says that it is a tree 6 m. tall, with white flowers. In all, 3 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: CULTIVATED: Cameroons: Herb. Bot. Gard. Victoria 42 (B--type, K--photo of type, N--photo of type, S--photo of type, Z--photo of type); H. Winkler 1132 (B, N).

CITHAREXYLUM SOLANACEUM var. MACROCALYX Moldenke in Fedde, Repert. 37: 234. 1934.

Literature: Moldenke in Fedde, Repert. 37: 234. 1934; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 88. 1942; Moldenke, Alph. List Cit. 2: 328 (1948), 3: 691 & 923 (1949), and 4: 1014. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 76 & 179. 1949; Moldenke, Phytologia 3: 74. 1949; Moldenke, Résumé 88 & 447. 1959.

This variety differs from the typical form of the species in having much longer and decidedly 2-lipped calyxes and usually narrower or even lanceolate leaf-blades. The calyx is tubular, 7.5--8 mm. long, 1.5--2.3 mm. wide, and its rim is very shortly 5-apiculate, 4 of the sinuses being about 0.2 mm. deep, while the fifth is about 3 mm. deep.

The type of the variety was collected by Friedrich Sellow somewhere in Brazil, and is deposited in the herbarium of the Botanisches Museum at Berlin. It is inscribed "Citharexylum solanaceum M. varietas" by Chamisso. The variety has been collected in anthesis in November, and in fruit in January, and is said to inhabit hills. In all, 9 herbarium specimens, including the type, and 10 mounted photographs have been examined.

Citations: BRAZIL: Rio Grande do Sul: Rambo 36422 (N). Santa Catarina: d'Urville s.n. (B); Ule 1159 (B, N--photo, P, Z--photo), 1538 (B, P). State undetermined: Sellow s.n. ["varietas"; Macbride photos 17600] (B--type, F--663029--photo of type, K--photo of type, Kr--photo of type, N--isotype, N--photo of type, N--photo of type, N--photo of type, P--isotype, S--photo of type,

Z—photo of type).

CITHAREXYLUM SPATHULATUM Moldenke & Lundell ex Lundell, Contrib. Univ. Mich. Herb. 8: 82—83. 1942.

Synonymy: *Citharexylum brachyanthum* var. *glabrum* C. L. Hitchc. & Moldenke ex Moldenke in Fedde, Repert. 37: 218. 1934. *Citharexylum brachyanthum* var. *glabrum* C. L. Hitchc. ex Moldenke, Prelim. Alph. List Invalid Names 16, in syn. 1940. *Lycium chateaui* Standl. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941.

Literature: Moldenke in Fedde, Repert. 37: 218. 1934; Moldenke, Geogr. Distrib. Avicenn. 4. 1939; Moldenke, Prelim. Alph. List Invalid Names 16. 1940; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 75. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 12 & 88. 1942; Moldenke, Alph. List Invalid Names 14 & 33. 1942; Lundell, Contrib. Univ. Mich. Herb. 8: 82—83. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2—4. 1943; Moldenke, Phytologia 2: 124—125. 1944; Moldenke, Alph. List Cit. 1: 100 & 321. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 5. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 53. 1948; Moldenke, Alph. List Cit. 2: 351 (1948) and 3: 681, 683, & 707. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 22 & 179. 1949; Salisb., Ind. Kew. Suppl. 11: 55. 1953; Moldenke, Résumé 27, 255, 319, & 447. 1959.

Slender shrub, to 1.8 m. tall, diffusely branched; stems to 12 mm. in diameter; branches long, slender, flexible, glabrous; branchlets slender, glabrous; twigs tetragonal or subterete, usually sharp-pointed, essentially glabrous, the youngest ones short-hirtellous at the nodes; leaf-scars small, short-stalked; leaves opposite on young shoots, clustered on short spur-like branchlets on older wood; petioles absent; leaf-blades green, chartaceous, spatulate, usually 0.8—2.5 cm. long, sometimes shorter, 2.5—5 mm. wide, usually rounded at the apex, sometimes shallowly emarginate to acutish or apiculate, entire, attenuate and very slender at the base, entirely glabrous or with a few short stiff hairs at the apex; midrib discernible but inconspicuous; veinlet reticulation not evident; flowers fragrant, usually 1 or rarely 2 terminating the very short spur-like branchlets; pedicels very short, densely white-hirtellous; calyx campanulate, about 3.5 mm. long, contracted at the base into a stipe about 0.5 mm. long, usually 5- or rarely 4-ribbed, sparsely short-appressed-hirtellous, the rim with 5 thick reflexed teeth, truncate or toothed between the primary teeth, ciliolate; corolla white, about 6 mm. long, sparsely hairy, the tube about 3.5 mm. long, densely barbate in the throat and upper half, the lobes ovate, rounded at the apex, ciliate; stamens 4, included; filaments hairy; staminode rudimentary, hairy; style 1 mm. long, stipitate-glandular on the basal half; ovary glabrous; fruit orange-red, globose, 6—7 mm. wide.

The type of this species was collected by Cyrus Longworth Lundell and Amelia A. Lundell (no. 9953) on sand in open scrub, 11 miles north of Mission, Hidalgo County, Texas, on April 4,

1941, and is deposited in the herbarium of the University of Michigan. The type of C. brachyanthum var. glabrum was collected by Emile Chateau at Mission, Hidalgo County, Texas, in April, 1929, and is deposited in the herbarium of the Chicago Natural History Museum. The type sheet of the latter was annotated "Citharexylum brachyanthum (Hemsl.) A. Gray var. glabrum n. var." by C. L. Hitchcock, but, as far as I am able to determine, this trinomial was never formally published by him.

At first I agreed with Hitchcock in regarding this plant as a mere variety of C. brachyanthum (A. Gray) A. Gray, differing in its glabrous leaves and twigs and geographic distribution. Lundell has pointed out, however, that flowering material shows that it had better be regarded as a distinct species. "The glabrous longer leaves, glabrous branchlets, and differences in the flowers," he says, "indicate that a distinct species is represented. In C. spathulatum the calyx-rim bears 5 thick reflexed teeth terminating the ribs of the tube; between these primary teeth, the margin is truncate or shallowly toothed. The calyx rim is suggestive of the genus Lycianthes in the Solanaceae. In C. brachyanthum the calyx has 5 conspicuous teeth with well-developed sinuses between each. Further, the flowering calyx of C. brachyanthum is somewhat smaller, the ribs are less evident, and the pubescence is dense. The corolla of C. brachyanthum is a third smaller. The interpretation of the flowers of C. brachyanthum is based upon Forrest Shreve 8421 from Coahuila, Mexico."

Herbarium material of this species has been misidentified in the Chicago Natural History Museum as Lycium barbinodum Miers. The species appears to have a very limited distribution: the known material having come from (1) Mission, (2) 11 miles north of Mission, (3) 14 miles north of Mission, (4) Moore Field north of Mission, (5) Sullivan City, and (6) off United States Highway 83 midway between Rio Grande City and Sullivan City, Texas.

The Schott s.n. from Eagle Pass, Texas, in the herbarium at Chicago, determined as C. brachyanthum var. glabrum by Hitchcock, is actually Lycium berlandieri Dunal.

Our plant has been collected in scrub, on gravel hills, and in brush on sandy plains, flowering in April, in fruit in November. In all, 10 herbarium specimens, including the types of all the names involved, and 10 mounted photographs have been examined.

Citations: TEXAS: Hidalgo Co.: Chateau s.n. [Mission, June 1929] (B--photo, F--588018, F--589084, F--589181, K--photo, N--photo, N--photo, S--photo, Z--photo); Lundell & Lundell 9953 (F--photo of isotype, Ld--isotype, Mi--type, N--photo of isotype, Si--photo of type, Z--photo of type), 12689 (N, Si), 12774 (N). Starr Co.: Lundell & Lundell 12676 (N); Marsh 44 (F--1028435).

CITHAREXYLUM SPINOSUM L., Sp. Pl., ed. 1, 2: 625. 1753.

Synonymy: Citharexylon americanum alterum, foliis ad marginem

dentatis Pluk., Almag. Bot. 108, fig. 5. 1696. Citharexylum americanum Mill., Gard. Dict., ed. 6, app. 1752. Cytherexylum quadrangulare Jacq., Enum. Syst. Pl. Carib. 26. 1760. Cytherexylum teres Jacq., Enum. Syst. Pl. Carib. 26. 1760. Citharexylum teres Jacq., Seget. Stirp. Amer. Hist. 185, pl. 118. 1763. Citharexylum quadrangulare Jacq. ex Murr. in L., Syst. Veg., ed. 13, 472. 1774. Citharexylum quadrangulare Jacq., Select. Stirp. Amer. Hist. Picta 91. 1780 [not C. quadrangulare Hort. Madrit., 1806, nor Sessé & Moc., 1894, nor Millsp., 1907, nor Boutelou, 1909, nor Griseb., 1909, nor A. Rich., 1909]. Citharexylum quadrangulare L. apud Lam., Encycl. Méth. Bot. 2: 133, in syn. 1786. Citharexylum teres Jacq. ex Sw., Obs. Bot. 234, in syn. 1791. Citharexylum quadrangulare Willd. apud Pers., Syn. Pl. 2: 142. 1806. Citharexylum caudatum Sw. apud Steud., Nom. Bot., ed. 1, 202, in syn. 1821 [not C. caudatum L., 1763, nor Citharexylum caudatum L., 1774, nor Seem., 1861, nor Sieb., 1896, nor Donn. Sm., 1907, nor Sagra, 1909, nor Cham. & Schlecht., 1940]. Citharexylum cinereum var. ρ Lam. apud Steud., Nom. Bot., ed. 1, 202, 1821. Citharexylum quadrangulare Jacq. ex Richter, Linn. Op. 603. 1835. Citharexylum spinosum L. ex Richter, Linn. Op. 603. 1835 [not C. spinosum Kunth, 1825, nor H. & B., 1840, nor H.B.K., 1845, nor Citharexylum spinosum H.B.K., 1817, nor Kunth, 1847]. Citharexylum caudatum Sw. apud Schau. in A. DC., Prodr. 11: 611, in syn. 1847. Citharexylum cinereum var. ρ Lam. apud Schau. in A. DC., Prodr. 11: 611, in syn. 1847. Citharexylum surrectum Griseb. (in part), Fl. Brit. W. I. 497. 1861. Citharexylum laevigatum Hostm. ex Griseb., Fl. Brit. W. I. 497, in syn. 1864. Citharexylum quadrangulare Schau. apud Griseb., Fl. Brit. W. I. 497, in syn. 1864. Citharexylum cinereum Jacq. apud O. E. Schulz in Urb., Symb. Antil. 6: 65, in syn. 1909 [not C. cinereum L., 1763, nor Sessé & Moc., 1831, nor Spreng., 1893, nor Donn. Sm., 1907, nor Citharexylum cinereum L., 1851, nor Spreng., 1851]. Citharexylum lucidum Griseb. (in part) apud O. E. Schulz in Urb., Symb. Antil. 6: 65, in syn. 1909 [not C. lucidum Schlecht. & Cham., 1830, nor D. Don, 1831, nor Cham., 1861, nor C. DC., 1942]. Citharexylum quadrangulare Hort. ex Gerth van Wijk, Dict. Plantnames 321. 1911. Citharexylum quadrangularis Jacq. ex Roig, Est. Exp. Agron. Santiago Vegas Bol. 54: 558. 1928. Citharexylum quadriloculare Jacq. ex Moldenke, Prelim. Alph. List Invalid Names 15, in syn. 1940. Citharexylum caudatum var. obtusifolium Hornemann ex Moldenke, Prelim. Alph. List Invalid Names 16, in syn. 1940. Citharexylum hostmannii Klotzsch ex Moldenke, Prelim. Alph. List Invalid Names 16, in syn. 1940. Citharexylum quaternangulatum Warb. ex Moldenke, Prelim. Alph. List Invalid Names 17, in syn. 1940. Citharexylum subdentatum Hort. ex Moldenke, Prelim. Alph. List Invalid Names 17, in syn. 1940. Citharexylum

laevigatum Hostm. ex Moldenke, Alph. List Invalid Names 58, in syn. 1942. Citharexylum americanum alterum, etc. Pluk. ex Moldenke, Alph. List Invalid Names 58, in syn. 1942. Citharexylon semiserratum Hort. ex Moldenke, Alph. List Invalid Names 58, in syn. 1942. Cytherexylon quadrangulare Jacq. ex Moldenke, Alph. List Invalid Names 58, in syn. 1942. Cytherexylon teres Jacq. ex Moldenke, Alph. List Invalid Names 58, in syn. 1942. Cithaexylum quadrangulare Jacq. apud Roig, Plant. Medic. 778, in syn. 1945. Cithaexylum spinosum L. apud Roig, Plant. Medic. 778. 1945. Cithaexylon quadrangulare Jacq. ex Moldenke, Alph. List Invalid Names Suppl. 1: 4, in syn. 1947. Cithaexylon spinosum L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 4, in syn. 1947. Citarexylum spinosum L. ex Alain in León & Alain, Fl. Cuba 4: 300. 1957. Citharexylon quadrangulare var. sterilis Hort. ex Moldenke, Résumé 254, in syn. 1959. Citharexylum hostmanni Vil. ex Moldenke, Résumé 256, in syn. 1959. Citharexylum quadrangulatum Jacq. ex Moldenke, Résumé 258, in syn. 1959.

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3: 140. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 41, 43, 46, 47, 49, 51--57, 62, 67, 68, 114, 128, 158, & 179. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 4. 1949; Roig, Dicc. Bot. 2: 1003. 1953; Moldenke, Journ. Calif. Hort. Soc. 15: 85. 1954; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 22--23. 1955; Alain in León & Alain, Fl. Cuba 4: 299--301. 1957; Moldenke in Steyermark, Fieldiana 28: 1083. 1957; St. John, Common Trees Univ. Hawaii n.p. 1957; Moldenke, Résumé 49, 51, 55, 56, 58--64, 70, 76, 78, 129, 140, 165, 203, 215, 252--259, 277, & 447. 1959; Box, Fl. Antigua, mss.

Illustrations: Pluk., Almag. Bot. 108, fig. 5. 1696; Jacq., Select. Stirp. Amer. Hist. pl. 118. 1763; Jacq., Hort. Vindob. 1: pl. 22 [colored]. 1770; Jacq., Amer. Gew. 2: pl. 197. 1787; Britton, Fl. Bermuda 316. 1918; Zuill, Trees & Pl. Bermudas [16]. 1931; Crevost & Pételot, Bull. Econom. Indo-chine 37: 1290. 1934; Benthall, Trees Calcutta 358. 1946.

Shrub or tree, to 16 m. tall; trunk to 35 cm. in diameter; crown narrow; wood pithy, brittle; branches and branchlets medium-slender, usually acutely tetragonal, gray or stramineous, glabrous; twigs slender, stramineous or brown, glabrate; nodes very obscurely annulate; principal internodes 1--4 cm. long; leaf-scars borne on large, ascending, corky sterigmata to 4 mm. long; leaves decussate-opposite, sometimes only one of a pair developed or one greatly reduced; petioles slender, 0.7--2.4 cm. long, orange when fresh, mostly canaliculate above, glabrous; leaf-blades membranous or chartaceous, sometimes firm, usually rather dull, rich-green above and pale-green beneath or uniform in color on both surfaces, often more or less brunneous in drying, elliptic or elliptic-oblong to oblong, rarely subovate, 3.5--29 cm. long, 1.3--11.3 cm. wide, mostly large, varying from obtuse (rarely emarginate) or acute to short-acuminate at the apex, entire (or rarely irregularly and coarsely dentate with large teeth on water-sprouts), acute or subacuminate at the base and usually bearing one or two black glands of varying dimensions there, glabrous on both surfaces or sparsely barbellate along the sides of the midrib and in the axils of the secondaries beneath; midrib slender, prominent beneath; secondaries slender, 5--8 pairs, arcuate-ascending, plane or very slightly prominulent above, prominulent beneath; vein and veinlet reticulation rather distant, mostly obscure on both surfaces or only slightly prominulent beneath; racemes axillary and terminal, mostly terminal, simple or compound with 1--5 pairs of basal branches, 2.5--35 cm. long, to 2 cm. wide during anthesis, rather loosely many-flowered, nutant; peduncles and the pale-green rachis slender, very sparsely and minutely pulverulent or glabrous, the former brown, 1.5--2.5 cm. long, usually with one bractlet-bearing node near the middle; pedicels very slender, 1.5--4 mm. long, glabrate; bracts usually absent, but when present large and foliaceous; bractlets linear, to 1 cm. long, glabrate; prophylla linear, 1--2 mm. long, glabrate; flowers very fragrant, with the odor of cherry-laurel (Laurocerasus officinalis Roem.) or heliotrope (Heliotropium peruvianum L.); calyx cyathiform, 3--4 mm. long,

pale-green, glabrous, its rim ciliate and obsoletely 5-dentate; corolla varying from white or whitish to cream-colored or reddish-white, subhypocrateriform or hypocrateriform to infundibular, its tube 4--6 mm. long, externally glabrous, white-villous at the mouth within, its limb 5-parted, the lobes suborbicular-lingulate, 2--3 mm. long, rounded at the apex, sparsely ciliate; filaments white; anthers brown; style green; stigma dark-green; ovary 4-celled, each cell with one locule; ovules axile just above the base of the locule; fruiting-calyx indurated, cupuliform or broadly cupuliform, 3--4 mm. long, 5--6 mm. wide, orange when fresh, often venose, glabrous, shiny, its rim irregularly erose or shallowly and irregularly lobed and more or less scarious; fruit drupaceous, oblong, about 8 mm. long and 6 mm. wide, very fleshy, brown-black or black to reddish-black when fresh, shiny and very much wrinkled in drying, often apiculate when immature.

The type of Plukenet's Citharexylon americanum alterum, on which Linnaeus later based his Citharexylum spinosum -- and the genus Citharexylum as well -- was collected by James Reed (or "Reid") in the Barbados islands before 1700 (the name is given in the ablativus as "Jacobus Reede" in Plukenet's Almagest. 108. 1696; cfr. Britten & Boulger, British & Irish Botanists, and Urb., Symb. Antil. 3: 110. 1902). It is deposited in the herbarium of the British Museum in London and has been examined but not annotated by me. C. surrectum was based by Grisebach on apparently unnumbered specimens collected by McNab and by Marsh at Port Royal, Jamaica, and by Wulfschlägel in Antigua.

The "Index Kewensis" erroneously accredits C. teres Jacq. to page "46" instead of 26 in his Enum. Syst. Pl. Carib. (1760).

The species is very widely distributed in the West Indies and northern South America, and is very widely cultivated, and sometimes naturalized, in other portions of the world. It has been collected in dense thickets, pastures, limestone sinks, wooded guts, native yards, and woods, along tree-bordered walks, creeks, roadsides, and streamsides, and on hillsides, plantations, shores, rocky wooded slopes, sand dunes, and xerophytic hillsides near the sea, at altitudes from sea-level to 500 meters. It has been collected in anthesis from April to February, inclusive, and in fruit from January to March and in August. Its wood is used commercially in Cuba, while Fawcett, in the 1891 reference listed above, quotes Harrison to the effect that it is "a most useful timber in building, close grained and very tough, used for mill rollers and frames, carriage wheels, &c."

Rondle comments that the species is common on hillsides in Bermuda, but is not native there, having been introduced. He says that it starts growing beneath the junipers, killing the juniper branches as it grows. It is, however, very brittle, and is destroyed by the hurricanes that hit the islands, which do not harm the junipers. Rankin gives us the information that it was introduced into the Bermuda islands "circa 1830". Egler reports that on Martinique it is found in Coccoloba forests, in the arid zone, elsewhere occasional along roadsides, and also in the lower part

of the humid zone. Duss reports it to be a tree of medium height, rarely of great height, with divergent branches, soon pendent. Robinson says that from his observation it is "commonly planted along walls, etc., and rarely tending to spread to roadsides" in Bermuda. Zuill says "Twice a year, in the spring and again in the autumn, the colour of the leaves turns from green to russet gold and adds brilliancy and variety to the landscape."

Benthall says that "In the tree's native country it is made into stringed musical instruments", and notes that in Calcutta "the flowers appear at the beginning of the rains. In shape and manner of growth they are reminiscent of the closely allied genus Duranta." Rendle and other authors have expressed doubt about this popular conception concerning the derivation of the scientific name of the genus and its common name of "fiddlewood". Miller, in his Gard. Dict., ed. 8, says that the names come from the French "bois fidele", which has nothing whatever to do with fiddles, and that the wood is not used at all for making any sort of musical instruments. Dr. Britton agrees with this explanation.

The species is very closely related to C. fruticosum L., but can usually be distinguished by its larger, broader, membranous or chartaceous, and less conspicuously veined mature leaf-blades. Sometimes there is a large terminal panicle produced, with 5 or 4 pairs of opposite branches, subtended by rather large bracts or bractlets, e.g., Brown & Britton 342 in the Gray Herbarium and at Philadelphia. On Boldingh 2385b the leaves are large, with prominent venation on both surfaces and heavy in texture, as in C. fruticosum, but the specimen seems to be from a sterile sucker. Killip & Lasser 37784 has very large, broad, and thin leaf-blades, and may also be from a root-sucker as I suggested on my supplementary annotation label. The Belgian Congo specimens cited below, both the cultivated and the naturalized ones, all have the leaf-blades rather small and stiff, with quite prominent venation, and thus resemble C. fruticosum.

The Bailey, Bailey, Whetzel, Degener, & McCallan s.n. of July 4, 1921, and the Herb. Singapore Bot. Gard. s.n., both cited below, have ternate leaves and racemes and have the corollas very densely pubescent, the calyx-rim subtruncate, and the pedicels elongate. However, the leaves on the young short twigs from the axils of the large leaves are opposite in normal fashion. The Dancer s.n. collection from Jamaica has the fruiting-pedicels long, stiff, and spine-like after the fruit and fruiting-calyx have dropped off. R. Moran 2644 has the leaves rather hairy along the entire venation beneath. The cultivated Herb. Burman specimen has deeply dentate leaves (as called for in the original description of the species). The two Klingen collections from India have remarkably small leaf-blades for this species, and have much the aspect of C. schottii Greerm. Roig 306 has much the aspect of C. caudatum L., but is certainly conspecific with Jenman 82 in the Kew herbarium, which is labeled "C. surrectum Griseb."

A specimen collected by Head in the Liverpool Botanic Garden

and deposited in the Torrey Herbarium, identified as C. quadrangulare, is actually a species of Viburnum in the Caprifoliaceae.

Material of C. spinosum has been misidentified in Indochina as Duranta stenostachya Tod., while Clemens & Clemens 3755 has even been confused with the genera Polyosma Blume of the Escalloniaceae and Lysimachia L. of the Primulaceae! Herbarium material has been misidentified as C. album Mill., C. caudatum L., C. cinereum L., C. coriaceum Desf., C. fruticosum L., C. subserratum Sw., Callicarpa americana L., Duranta plumieri Jacq., Clethra arborea Ait., Putranjiva roxburghii Wall., Sideroxylon album Hort., S. cinereum Lam., and Berberis sp.

Citharexylum coriaceum Desf. is said by some authors to be conspecific with C. spinosum, but in my opinion actually belongs in the synonymy of C. fruticosum. Similarly, C. cinereum Sessé & Moc. is reduced to C. spinosum by some writers, but I have examined the type and it is definitely C. fruticosum. Sprengel, Steudel, Walpers, Schauer, and Augusto all reduce C. teres to synonymy under C. cinereum L., which is incorrect since Linnaeus' name plainly refers to what we now call C. fruticosum. The Citharexylum fruticosum cortice cinereo etc. P. Browne and the Citharexylon arbor laurifolia Pluk. which Walpers cites in his synonymy actually belong under C. fruticosum, while the Jasminum arborescens racemosum etc. Plum., which he also cites, belongs under C. caudatum.

The Glaziou 9989 cited as C. quadrangulare by Glaziou in the reference listed above is actually C. myrianthum Cham., while the no. 11328 also cited by him as C. quadrangulare is C. glaziovii Moldenke.

Box, in his manuscript "Flora of Antigua", reduces C. fruticosum L., C. subserratum Sw., and C. quadrangulare Griseb. to synonymy under C. spinosum L. He cites Tate s.n. in the Sloane Herbarium, vol. 193, fol. 29, at the British Museum, from Antigua, and states that he and Charter "noted" the species also on Barbuda island in May, 1937. He states that on Antigua the species is found in xerophytic woods, especially in the coastal areas, occasional to frequent locally.

Robinson, in a note written on a herbarium specimen, states that he is "very doubtful" if C. quadrangulare really is conspecific with C. spinosum. The Citharexylum cinereum L. sensu Pulle, Enum. Pl. Surin. 403 (1906) is certainly C. spinosum. The illustrations published as C. quadrangulare in Lubbock, Journ. Linn. Soc. Lond. Bot. 33: 231 (1897), Contrib. U. S. Nat. Herb. 8: pl. 27 (1903), and Avebury, Buds & Stipules 76 (1908), on the other hand, are actually C. fruticosum! Persoon, in his Syn. Pl. 2: 142 (1806), cited "Willd., p. 359", but this seems to refer to Willd., Sp. Pl. 3: 308--309 (1801).

Broadway 955, 4064, and 6658, Eggers 5484, and Smith & Smith 405 seem to represent a natural hybrid with C. fruticosum, discussed in these notes under xC. hybridum Moldenke. Otero 681 has the upper leaves thin and the lower ones subcoriaceous, and looks like this same hybrid. Perkins 1320 is certainly a hybrid with C. caudatum, herein treated under xC. perkinsi Moldenke. It is very possible that some or all of the anomalous specimens mentioned in previous paragraphs may also represent one or the other of these hybrids.

The Herb. Hort. Audibert material and the two Collector undesigned s.n. specimens, all cultivated in France, cited below, have very chartaceous young leaves, small in size, and villous along the midrib and larger venation beneath. The Herb. DeCandolle 930 is intermediate between them and the normal form of the species. It is probable that all came from a tree cultivated in the Trianon gardens.

Moldenke 8382 was taken from a plant said to be New York Botanical Garden Cultivated Plants 13449, but is plainly C. spinosum, while the herbarium specimen of that garden record number preserved in the Cultivated Herbarium at the New York Botanical Garden is apparently C. fruticosum. It may be that the plant from which Moldenke 8382 was taken was actually a plant belonging to the New York Botanical Garden Cultivated Plants 43651 lot, which is C. spinosum. Gardeners may have erroneously transferred the labels in the greenhouse, or accidentally mixed some of the seeds. Hartley s.n., also supposedly representing no. 13449, is herein cited as C. spinosum, but is anomalous -- some of its leaves are firm-textured, with raised venation, and dentate. It is also possible that some or all of these puzzling anomalies may have been brought about by the abnormal conditions of indoor greenhouse cultivation.

The "Duranta stenostachya Tod.?" reported by Setchell in Univ. Calif. Publ. Bot. 12: 205 (1926) as cultivated in the Experimental Garden at Papeete and "originally from Brazil; large tree", is C. spinosum. Indo-chinese specimens labeled as Duranta stenostachya have also proved to be C. spinosum. Setchell annotated his specimen as "Duranta or a 1-foliolate Vitex". C. spinosum is not known from Brazil, although cited from there by Pulle in error.

Anstead says that C. spinosum is "a common tree under cultivation in South India. Flowers white and very fragrant. Needs a lot of water." Burchard says that it is a "very rare tree in shady places opposite La Orotava" on Tenerife in the Canary Islands. He does not indicate that it is cultivated there, so I assume that it has become naturalized.

I have personally observed a plant of this species cultivated in the Temperate House at the Royal Botanic Gardens at Kew, wrongly labeled there as C. barbinode Cham.

The bark and wood are often attacked by the fungus Polyporus marasmioides (Pat.) Sacc. & D. Sacc. [Melanopus marasmioides Pat.] and the leaves by Gloeosporium cytharexyl Scalia. Vernacular names recorded are "arbol de Santa Maria", "aschgrauer Geigenholzbaum", "bois carré", "bois cotelet", "bois côtelet", "bois cotelet carré", "bois côtelette", "bois de cotelette", "bois de fer blanc", "bois de guitare", "bois fidele", "bois fidèle", "bois guitare", "bois guitarin", "cautau", "cautau nhô", "côtelette", "cutlet", "fairy", "fiddle wood", "fiddlewood", "fiddle-wood", "fig bush", "Geigenholz", "guayo blanco", "higuerillo", "juniper-berry", "penda", "savannah wattle", "susanna", "susanna tree", "vedelhout", "white fiddle-wood", and "zither-wood". Of these names, however, "Geigenholz", "fiddle-wood", "susanna", and "zither-wood" are applied also to the genus as a whole; "juniper-berry" and "white fiddle-wood" are applied also to C. caudatum; "cutlet" to C. fruticosum and its varieties brittonii and villosum; "guayo blanco" to C. fruticosum and to C. tristachyum Turcz.; "penda" to C. caudatum, C. fruticosum and its varieties subvillosum and villosum, and Cornutia pyramidata L.; "fiddle-wood" to C. caudatum, C. fruticosum, and Petitia domingensis Jacq.; "fiddlewood" to C. fruticosum var. brittonii and var. villosum, Cornutia pyramidata, Petitia domingensis, Vitex gaumeri Greerm., and V. umbrosa Sw.; and "higuerillo" to C. caudatum and Vitex divaricata Sw.

The finest collection of herbarium material of this species is seen in the Naturhistorisches Museum at Vienna. In all, 547 herbarium specimens, including the types of all the names involved, and 10 mounted photographs and paintings have been examined.

Citations: BERMUDA: Bailey, Bailey, Whetzel, Degener, & Mc Callan s.n. [Experiment Station, June 30, 1921] (A, N), s.n. [July 4, 1921] (Ba), s.n. [Sept. 10, 1921] (Y); S. Brown 597 (D--534797, F--244251, G, N, W--848410); Brown & Britton 342 (A, Ca--370291, D--511443, Es, F--203871, G, K, N, Up--45690, W--524922), 1075 (D--556541, N); F. S. Collins 258, in part (P), 259 (B, Cm, F--464807, G, K, L, N, N--photo, V--6799, W--717554, Z--photo); Degener s.n. [September 10, 1921] (It); T. J. Harris 16 (K); Harshberger s.n. [6/16/05] (Up--39532), s.n. [Limestone sinks, Walsingham] (D--532179, E--119084, G, W--847511); C. F. Millspaugh 122 (F--60122); A. H. Moore 3085 (G), 3131 (G, Gg--155401, Mi), 3132 (G, Gg--155402); Rendle 553 (Bm, Bm); B. L. Robinson 28 (G); Setchell & Setchell s.n. [June 3, 1921] (Ca--213491). CUBA: Camagüey: Roig, Luaces, & Arango s.n. [Herb. Roig 8186] (Es). JAMAICA: R. C. Alexander s.n. [Moneague] (K); Dancer s.n. (Cb); Howard & Proctor 13748 (N), 14026 (N); Jenman 82 (K); March 1003 (K), 1046 (K), s.n. (B); Swartz s.n. (S, S); N. Wilson s.n. (K); Wulfschlägel 425 (Mu--759, V--88189), 426 (Mu--748, V--88190), 1287 (Mu--1094, V--88225). HISPANIOLA: Dominican Republic: Charadon 438, host (It); Fuertes 88, in part (F--385105, S). PUERTO

RICO: Otero 681 (Bt--52551, N); Sintenis 6928 (B). CABRAS ISLAND: Otero 92 (N). VIRGIN ISLANDS: St. Croix: Benzon 1 (S); Britton & Cowell 60 (B, N); Collector undesignated s.n. [St. Croix] (Dc); A. E. Ricksecker 424 (B, Ca--473016, Du--210263, E--119088, F--70831, Ob--114856, Ol, P), 424 bis (F--70831); West s.n. (L). St. John: Benzon s.n. [1820] (Cp). LEEWARD ISLANDS: Antigua: Box 1176 (N); Wulfschlagel s.n. (Mu--760). Dominica: Finlay s.n. [Prince Rupert's Head, June 1792] (K); Hodge 871 (N), 872 [August 27-31, 1938] (N); Hodge & Hodge 1505 (Ms); Imray 100 (G, K), 376 (L); Kraus 119 (Ed); Nicholls 15 (B), 31 (B, Le, S). Guadeloupe: André 7 (K); Duchassaing s.n. (B); Duss 307 (P), 2944 (B, F--202763, N, W--849946); Grèbert 26 (P); Perrottet 138 (P), 278 (Cb, Cb), s.n. [18 juin 1824] (Dc), s.n. [1824] (Cb, Cb, Cb, Cb, Cb); Stehlé 164 (S), 265 (Mi, S), 407 (N), 427 (Mi, S), 1396 (N). Montserrat: Robeson 21 (K). Saba: Suringar s.n. [22 April '85] (Le). St. Eustache: Boldingh 53b (Ut), 271b (N, Ut, Ut), 641ab (Ut), 746b (Ut), 984ab (N, Ut), 1314b (Ut), 1527b (Ut), 2473ab (Ut); Collector undesignated s.n. (Le); Groll-Meyer 128 (Ut); Suringar s.n. [10 April '85] (Le), s.n. [16.IV.1885] (B, Le). St. Martin: Boldingh 2385b (Ut), 2818b (Ut); Collector undesignated 68 (Le); Rijgersmaa s.n. [1868] (S). WINDWARD ISLANDS: Barbados: Bovell s.n. [Herb. Bot. Stat. Barbados 229] (N); Gooding 228 (N); E. H. L. Krause 88 (B, B); A. E. S. McIntosh s.n. [May 1935] (Bb); J. Reed s.n. (Bm--type); Willich & Weiss 7118 (B). Bequia: Joseph B. 43 (B), B. 44 (C). Grenada: W. E. Broadway 3725 (B), s.n. [June 23, 1906] (Ed); Eggers 6285 (A, B, B, P, P). Martinique: André 1410 (K); Bélanger 196 (P, P), 258 (Cb); Duss 2026 (N, N, W--849749), 2026b (B), 2027 (B, B), 2027a (N, N, W--849750); Egler 39-190 (N); Forster s.n. (K); Hahn 603 (Mu--1374), 609 (B, Bm, Bm, Ca--453685, Cb, Cb, Cb, Cb, G, K, K, L, P, P, P, P, V, W--57328, X, X), s.n. (F--236896); Herb. Portenschlag s.n. (V); Herb. Reichenbach f. s.n. (V); Isert 87 (Cp); Plée s.n. (B, P); L. C. Richard s.n. (P); Sieber Fl. Mart. 156 (B, B, B, B, Br, E--119089, K, L, Le, Mu--758, P, V--285032, V--285052, V, V, X), Fl. Mixta 396 (L, L, L, L, L, Le, Lu, M). Mustique: Smith & Smith 140 (Bm, G). St. Lucia: Anderson s.n. [Belair, May 14, 1889] (K); P. Beard 1010 (S); Crudy s.n. (Mu--757); Herb. Schwägrichen s.n. (Mu--1377); Ponthieu s.n. (Bm); Ramage s.n. (B, Bm, K). St. Vincent: Eggers 6536 (B, B); E. H. L. Krause 11 (B), 12 (B), 13 (B); Morton 4669 (W--1883833, W--1883834), 5737 (W--1884585); Smith & Smith 66 (C), 1786 (Bm). TOBAGO: W. E. Broadway 3821 (B, Bm, Cb, Cb, Cb, Cb, Ed, F--376487, F--376488, G, N, S, Ut), 3831 (Cp); R. O. Williams s.n. [Herb. Trin. Bot. Gard. 11155] (K). TRINIDAD: Bailey & Bailey s.n. [Port-of-Spain, Feb. 11, 1921] (Ba); W. E. Broadway s.n. [Herb. Trin. Bot. Gard.

4508] (R, R); Fendler 597 (Ed, Ed, K, N--photo, Pa, W--57327, Z--photo); Hart 3836 (Cb, Le, S); Herb. Trin. Bot. Gard. 430 (R); Swabey s.n. [Herb. Trin. Bot. Gard. 12905] (R), s.n. [Herb. Trin. Bot. Gard. 12958] (R); R. O. Williams s.n. 11155] (R). CURACAO: Otto 892 (B). WEST INDIES: Island undesignated: Herb. Adanson s.n. (P, P, P, P, P); Herb. Boos s.n. (V); Herb. Braun s.n. (L); Herb. Fischer s.n. (L, L); Herb. Jacquin s.n. (Bm, Bm, V); Herb. Jewett s.n. (Mi); Herb. Liebmann s.n. (Cp, Cp); Herb. Montinu s.n. (S); Herb. Reichenbach f. s.n. (V--180809, V--285051); Herb. Schrader s.n. (L, L); Herb. Trattinek s.n. (V); Herb. Univ. Christian. s.n. (Ol); Herb. Vaillant s.n. (P, P); Krebs s.n. (Cp); Ponthieu s.n. [Ind. occid.] (Bm, Bm); Sieber s.n. [Herb. Sprengel] (B). VENEZUELA: Aragua: Killip & Lasser 37784 (W--1855741). Bolívar: Steyermark 60941 (N). Federal District: Vargas 91 (Dc, Dc). SURINAM: Berthoud-Coulon 566 (Bm); B. W. Forestry Dept. 377 (Ut, Ut); Collector undesignated s.n. (Le); Focke 566 (Ed, Ut); Herb. Canby s.n. [Surinam] (Pa); Hostmann 356 (Cb, Cp, F--686713, Gt, Gt, L, Le, P, P, V--112481, V, X), 556 (B, Bm, Cb, K, K, Ut, V--211636, V--285046, V), s.n. (Le); Hostmann & Kappler 190 [357] (S), 356 (B, E--119102, Mu--1376, P, S, Ut, V--112480, V, V, X), 556 (P); Kappler 356 (L, Mu--1178, P, X); Kegel 1242 (Gt); Kuyper 17 (N, Ut); Samuels 280, in part (A, B, G, K, Le); Splitgerber 70 (Le), s.n. [Nov. 1837] (Cb, Le, P, V); Tullock 29 (Le, Le, Le, Le); Weigelt s.n. (D, D); Went 298 (Ut); Wullschlägel 410 (Br, Br), 3706 (V--161110). FRENCH GUIANA: W. E. Broadway 372 (G, N, W--1068665); Collector undesignated 358 (B); Gabriel s.n. [1802] (Cb, Cb, Cb); Herb. Barbier s.n. (P); Herb. Thibaud s.n. [Cayenne, 1815] (Dc). CANARY ISLANDS: Tenerife: C. Burchard 191 (S), s.n. [Nov. 1934] (S). BELGIAN CONGO: M. Laurent s.n. [1906] (Br, Br); Pynaert 327 (Br), s.n. [1906] (Br), s.n. (Br); Vermoesen 2145 (Br, Br). FRENCH INDIA: Contest-Laceur s.n. [Pondichéry, juill. 1864] (Lu). HAWAIIAN ISLANDS: Oahu: A. R. Cooke s.n. [Manoa Trail, Sept. 26, 1954] (Ok). CULTIVATED: Annam: Clemens & Clemens 3755 (Ca--340564, Gg--156575, Mi, N, Ut--99809), s.n. [August 29, 1927] (Ca--339962). Australia: J. L. Bailey s.n. [Bot. Gard. Adelaide] (A). Austria: Hebenstreit 791 (L); Herb. Hort. Schönbrunn s.n. [VI.87] (Cp), s.n. [1815] (V, V), s.n. [5. 1] (V); Host s.n. [herb. hort. Vindob.] (V). Azores: Carreiro 40 (E--40789); Ogilvie-Grant 40 (Ed). Belgian Congo: Corbisier 135 (Br, Br, Br); M. Laurent 1283 (Br); Pynaert 377 (Br), 577 (K); Vermoesen s.n. [1919] (Br, Br). Belgium: Lejeune s.n. [Hort. Bot. Lovan.] (Br); Pollard de Canidri s.n. (Br). Bermuda: Rankin s.n. [July 5, 1897] (Pr). California: R. Moran 2644 (N). Cameroons: Deistel 567 (B, G, Ut); Herb. Versuchsanstalt Kamerun 567 (Us); Preuss 1309 (B, B). Ceylon: H. Hallier C.237 (Le). Chile: Bridges s.n. [Coquimbo] (L). Cuba: Roig 306 (Es). Denmark: Herb. Hort.

Bot. Haun. s.n. [17/11/1924] (Cp, Cp). Dominica: Hodge 872 [August, 1937] (N). East Indies: Collector undesignated s.n. (Dr).
Egypt: Fishe s.n. (Le); G. Maire 1187 (La). England: Herb. Hort. Sherard s.n. (Bm); Herb. Hort. Stucker s.n. [Herb. A. L. Jussieu 5091] (N—photo, P, Z—photo); Moffatt 1772 (Ed). France: Collector undesignated s.n. [29 aout] (Dc), s.n. [Trianon] (Dc); Gouan s.n. [Montpellier] (K, N—photo, Z—photo); Herb. De Candolle 930 (Dc); Herb. Hort. Audibert s.n. (Dc); Herb. Hort. Bot. Paris s.n. (Cb, Cb); Herb. Hort. Malmaison s.n. (L); Herb. Hort. Monspeiliensis s.n. (L); Herb. Jard. Gouffé s.n. [Sept. 12, 1821] (K). French India: Contest-Lacour s.n. [1868] (Lu); Herb. Ind. Fr. s.n. [Pondichery] (L). Germany: Herb. Hort. Bot. Götting. s.n. [Nov. 1799] (E—119091, E—119092); Herb. Kummer s.n. (Mu—1379, Mu—1387); Herb. Link s.n. (B). Hongkong: W. Y. Chun 9168 (N). India: Anstead 32 [Coimbatore, S. India] (A); Bourne s.n. [Madras, 26 May 1900] (K); Gamble 10724 (K), 17050 (K); Herb. Bot. Gard. Saharanpur 6208 (K); Herb. Hort. Bot. Calcuttensis s.n. (Le, Mu—761); Herb. Pierre s.n. [Hort. Bot. Cal. mai 1864] (P); Klingen s.n. [Herb. Bot. Gard. Saharanpur 1305/84] (L), s.n. [Herb. Bot. Gard. Saharanpur 1306/139] (L); Lushington s.n. [cult. Hospet] (K); Meebold 13878 (B); Parker s.n. [Govt. Agr. Hort. Gardens, Lahore] (A). Italy: Herb. Giard. Bot. Jirezza Pisa s.n. [1814] (S); Herb. Hort. Florentia s.n. (Cb); Herb. Hort. Neapol. s.n. [Sept. 1832] (Le); Herb. Jan. s.n. [14-2-17] (V—225442). Java: Herb. Hort. Bot. Batavia s.n. [Nov. '79] (B); Herb. Mus. Hort. Bot. Bogor. XI.G.17 (Bz—25784, Bz, Bz, Bz, Bz, N), XI.G.19 (Bz—25786, Bz, Bz, Bz, Bz, N); E. Nyman s.n. [h. b. Buitenz.] (Us); Warburg 1541 (B). Mauritius: Herb. Dept. Agr. Riduit spec. A [21/8/36] (K). Missouri: Herb. Ames s.n. [St. Louis] (Oa). Netherlands: Herb. Hort. Amsterdam s.n. (Le); Herb. Hort. Gr. s.n. [1831] (Ut); Herb. Persoon s.n. (Le); Herb. Royen s.n. (Le, Le); Korthals s.n. (Le). New Caledonia: Le Comte s.n. [Cal. franc.] (B). New York: Hartley s.n. [N. Y. Bot. Gard. Cult. Pl. 13449] (Ur), s.n. [N. Y. Bot. Gard., 3/17/20] (Ur); H. N. Moldenke 4433 (N, N, N, Z), 8381 [N. Y. Bot. Gard. Cult. Pl. 47859; Pl. Ind. No. 43651] (N), 8382 (N), 8383 [N. Y. Bot. Gard. Cult. Pl. 55098] (N); N. Taylor s.n. [N. Y. Bot. Gard. Cult. Pl. 4494] (N). Singapore: Herb. Singapore Bot. Gard. s.n. [1 Feb. 1925] (Ba, N). Southern Rhodesia: Stent s.n. [Herb. Govt. S. Rhodesia 4449] (N, N). Tahiti: Setchell & Parks 390 (Ca—219859). Trinidad: W. E. Broadway 3836 [Trin. Bot. Gard. Herb. 3836] (B, Cp, Le, Mu—4308, R, R); Mell s.n. [Bot. Gard., Aug. 10, 1923] (N). LOCALITY OF COLLECTION UNDETERMINED: Barbier s.n. [1847] (P); Collector undesignated s.n. (Dc, Dc, P); Herb. Adanson s.n. (P); Herb. Burman s.n. [Burcardia] (Cb); Herb. A. L. Jussieu

5086 (P); Herb. Lamarck s.n. (P); Herb. Ledebour s.n. (L); Herb. Lugd.-Bat. 908266-612 (Le); Herb. Mus. Bot. Lund. s.n. (Lu); Herb. Mus. Nac. Hist. Nat. Chile 16057 (Sg); Herb. Schrader s.n. (L); Herb. Schreber s.n. (Mu--756); Herb. Schultes s.n. (Mu--1378); Herb. Univ. Edinb. s.n. (Ed); Née s.n. (Du--166411). MOUNTED ILLUSTRATIONS: Colored plate s.n. (N, N).

CITHAREXYLUM STANDLEYI Moldenke in Fedde, Repert. 37: 234. 1934.

Literature: Moldenke in Fedde, Repert. 37: 234. 1934; Moldenke, Brittonia 1: 364. 1934; Standl., Field Mus. Publ. Bot. 18: 1001--1002. 1938; Hill, Ind. Kew. Suppl. 9: 67. 1938; Moldenke, Geogr. Distrib. Avicenn. 17: 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 23, & 88. 1942; Moldenke, Alph. List Cit. 1: 320 & 322. 1946; Moldenke, Phytologia 2: 384. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 84. 1948; Moldenke, Alph. List Cit. 2: 343 & 436 (1948) and 4: 1000, 1057, & 1082. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39, 40, & 179. 1949; Moldenke, Résumé 46 & 447. 1959.

Tree; branchlets and twigs very slender, acutely tetragonal, very light-brown, pulverulent or glabrate, lenticellate; nodes conspicuously annulate; principal internodes 1.5--6 cm. long; leaves decussate-opposite; leaf-scars borne on short ascending sterigmata to 3 mm. long; petioles slender, 7--17 mm. long, deeply canaliculate above (when mature), glabrous; leaf-blades chartaceous, uniformly light-green and shiny on both surfaces, elliptic, 4.5--18 cm. long, 2.5--7.6 cm. wide, acute or short-acuminate at the apex, entire, acute at the base and somewhat prolonged into the petiole, bearing 1 or 2 pairs of black glands on the prolongation beneath, glabrous on both surfaces or minutely pulverulent beneath; midrib slender, prominulent beneath; secondaries slender, 6--8 pairs, arcuate-ascending, especially arcuate at their apex, more or less irregular, prominulent beneath and slightly so above; vein and veinlet reticulation very abundant, plane beneath, prominulent and conspicuous above; racemes terminal, greatly elongated, 14--48 cm. long, nutant, loosely many-flowered, simple, 1.5--2 cm. wide; peduncles and rachis slender, light-brown, often lenticellate, mostly sharply tetragonal, pulverulent or glabrate, the former 6--6.5 cm. long, usually with 2 or 3 nodes, each of which bears a pair of bractlets or buds; pedicels (in fruit) stoutish, 1--1.5 mm. long, glabrous; bracts (if any) and bractlets caducous; prophylla setaceous, minute; flowers not seen, except for calyxes from which the corolla has fallen, these indurated, tubular-campanulate, light-brown and venose, 3.5--4 mm. long, 2.5--3 mm. wide, glabrous, the rim truncate and subentire; fruit not known.

The type of this species was collected by Adolfe Tonduz (no. 8735) in the forests of Sipurio, Talamanca, at an altitude of 100--180 meters, Cartago, Costa Rica, in April, 1894, and is deposited in the Herbarium Boissier at Geneva. It is named in honor of my good friend and colleague, Paul Carpenter Standley, who has done such outstanding work on the flora of Central America. The species is sometimes cited from Bocas del Toro, Panama, on the basis of Dr.

John H. Barnhart's assertion that Talamanca lies in that country as well as in Costa Rica and that the Pittier and Tonduz localities are in the southern portion, therefore in Panama (cfr. Brittonia 1: 364. 1934). Dr. Pittier, however, assured me personally that he and Tonduz did all their collecting in the northern or Costa Rican portion of the territory.

The species ascends to 1400 meters altitude and has been collected in anthesis in July. It has been confused by herbarium workers with C. cooperi Standl., C. quadrangulare Jacq., and C. reticulatum H.B.K. In all, 23 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: COSTA RICA: Cartago: Tonduz 8735 (B--photo of type, Bm--isotype, Br--isotype, Br--isotype, Cp--isotype, Cp--isotype, F--576659--isotype, F--600294--isotype, K--photo of type, Le--isotype, Le--isotype, Mu--3786--isotype, N--isotype, N--isotype, N--isotype, N--photo of type, P--isotype, S--isotype, S--isotype, S--photo of type, W--1323224--isotype, X--type, X--isotype, X--isotype, X--isotype, Z--photo of type). San José: M. Valerio 1648 (F--905219).

CITHAREXYLUM STANDLEYI var. MEXICANUM Moldenke, Phytologia 4: 43. 1952.

Literature: Moldenke, Phytologia 4: 43 & 68. 1952; Moldenke, Résumé 35 & 447. 1959.

This variety differs from the typical form of the species in having its fruiting-racemes only 3.5--8 cm. long and its leaf-blades minutely puberulous throughout on the lower surface and much more densely so on the larger venation.

The type of the variety was collected by B. L. Turner (no. 2077) in gravelly-clay soil on a dry streambank, one mile east of La Placita, 45 air miles south of Colima, Michoacán, Mexico, on July 4, 1950, and is deposited in the herbarium of the University of Michigan. Thus far it is known only from the type collection, and only 2 herbarium specimens have been examined.

Citations: MEXICO: Michoacán: B. L. Turner 2077 (Mi--type, N--isotype).

CITHAREXYLUM STENOPHYLLUM Urb. & Ekm. ex Urb., Arkiv Bot. 22a, 17: 106--107. 1929.

Literature: Urb., Arkiv Bot. 22a, 17: 106--107. 1929; Hill, Ind. Kew. Suppl. 8: 53. 1933; Moldenke, Geogr. Distrib. Avicenn. 7. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 26 & 88. 1942; Moldenke, Alph. List Cit. 1: 189 (1946) and 4: 1062 & 1066. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 47 & 179. 1949; Moldenke, Résumé 56 & 447. 1959.

Shrub; branches and branchlets very slender, grayish, acutely tetragonal, glabrous; twigs very slender, acutely and sharply tetragonal, stramineous, glabrous; nodes not annulate; principal internodes 0.5--5 cm. long, usually much abbreviated on twigs; leaf-scars borne on corky ascending sterigmata 1--3 mm. long; leaves decussate-opposite, numerous; petioles slender, 1--5 mm.

long, glabrous, usually more or less margined; leaf-blades firmly chartaceous or subcoriaceous when mature, very thin-membranous when immature, uniformly gray-green and shiny on both surfaces when mature, nigrescent in drying when immature, linear, often subfalcate, 1.8—6.5 cm. long, 3—6 mm. wide, acute to more or less tapering at the apex, entire, attenuate into the petiole at the base, not glanduliferous, completely glabrous on both surfaces; midrib slender, plane or slightly prominulous above, prominulous beneath; secondaries 3—5 pairs, ascending, slightly prominulous above, prominulous beneath; vein and veinlet reticulation slightly prominulous above, prominulous beneath; racemes axillary and terminal, 1—3 cm. long, simple, rather few-flowered; peduncles and rachis very slender, glabrous; bracts and bractlets foliaceous, membranous; prophylla linear, about 1 mm. long; mature flowers not seen; immature calyx campanulate-turbinate, its rim truncate, minutely denticulate and ciliate; corolla said to be white; fertile anthers 4; fruiting-calyx and fruit not seen.

The type of this distinctive species was collected by Erik Leonard Ekman (no. H.10576) on eruptive soil at an altitude of 1300 meters on the slope of Morne Sentier, Tiburon, in the western group of the Massif de la Hotte, Haïti, on August 26, 1928, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The collector describes it as rare. The mature leaves have the consistency of those of *C. fruticosum* var. *smallii*, to which it is obviously related. In all, 8 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: HISPANIOLA: Haïti: Ekman H.10576 (B—*isotype*, B—photo of type, K—photo of type, N—*isotype*, N—*isotype*, N—*isotype*, N—photo of type, S—type, S—*isotype*, W—1414062—*isotype*, W—1479700—*isotype*, Z—photo of type).

CITHAREXYLUM STEYERMARKII Moldenke, Phytologia 2: 14—15. 1941.

Literature: Moldenke, Phytologia 2: 14—15. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 88. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 84. 1948; Moldenke, Alph. List Cit. 2: 351 (1948) and 3: 973. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 35 & 179. 1949; Salisb., Ind. Kew. Suppl. 11: 55. 1953; Moldenke, Résumé 41 & 447. 1959.

Shrub, to 3.1 m. tall; branches tetragonal, brownish, glabrous, medium-slender, shiny; youngest twigs minutely puberulent; nodes annulate; principal internodes 1.5—10.5 cm. long; leaves decussate-opposite; petioles stout, 5—18 mm. long, glabrous; leaf-scars large, corky, prominent, divergent, 3—4 mm. long; leaf-blades chartaceous when young, subcoriaceous when mature ["firmly membranaceous" according to the collector], elliptic, dark-green above, paler beneath, 4.5—18 cm. long, 1.8—7.8 cm. wide, acuminate at the apex, entire, often slightly undulate along the margins, acute or acuminate at the base, glabrous or very minutely and obscurely pulverulent-punctate on both surfaces, very minutely and obscurely short-puberulent along the midrib above; midrib slender, flat or subimpressed above.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS CITHAREXYLUM. VII

Harold N. Moldenke

CITHAREXYLUM STEYERMARKII Moldenke

Midrib very prominent beneath; secondaries slender, 7 or 8 per side, arcuate-ascending, flat or subprominulous above, very sharply prominent beneath, joined in many loops near or at the margins beneath; veinlet reticulation very abundant, conspicuously prominulous above, sharply prominulous beneath; inflorescence terminal, racemiform; racemes simple or the large ones branched at the base, 6--15 cm. long, densely many-flowered; peduncles and rachis slender, minutely puberulent, the former 2--2.5 cm. long; pedicels very slender, 1--2 mm. long, puberulent, in fruit to 3 mm. long and glabrescent; calyx campanulate, about 3 mm. long and wide, light, very shiny, glabrous, the rim truncate and entire, short-ciliolate; corolla hypocrateriform, sweet-scented, its tube 5 mm. long, the lobes spreading, slightly squarrose, densely pubescent on the inner face; fruiting-calyx slightly indurated, cupuliform, about 3 mm. long and 5 mm. wide, light-colored, glabrous, very shiny, its rim truncate and entire; immature fruit subglobose, greenish, tinged with dull-orange, about 5 mm. long and wide, glabrous.

The type of this species was collected by Julian Alfred Steyermark (no. 31433) -- in whose honor it is named -- on shaded cloud-forest slopes on top of Volcán Quezaltepeque, 3--4 miles northeast of Quezaltepeque, at an altitude of 1500--2000 meters, Chiquimula, Guatemala, on November 8, 1939, and is deposited in the herbarium of the Chicago Natural History Museum. The type sheet is in fruit and has its leaves subcoriaceous, 4.5--11.5 cm. long and 1.8--4.2 cm. wide. An isotype, also at Chicago, is in flower and has its leaves larger and thinner, merely chartaceous in texture, to 18 cm. long and 7.8 cm. wide. In all, 4 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: GUATEMALA: Chiquimula: Steyermark 31432 (F--1039540), 31433 (F--1041184--isotype, F--1041191--type, N--isotype, N--photo of type, N--photo of isotype, Z--photo of type, Z--photo of isotype).

CITHAREXYLUM SUBEROSUM Loes. ex Moldenke, Geogr. Distrib. Avicenn. 23, nom. nud. 1939; sp. nov.

Frutex vel arbor; ramis acute tetragonis crassis suberosis; ramulis brunneis acute tetragonis saepe marginatis glabris; foliis oppositis; petiolis percrassis plerumque marginatis; laminis coriaceis ellipticis acutis vel breviter acuminatis parce serratis vel subintegris, ad basin subcuneatis, saepe glanduliferis, utrinque glabris; inflorescentiis axillaribus terminalibusque rectis vel nutantibus simplicibus densiuscule multifloris glabris.

Literature: Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Mol-

denke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 88 (1942) and [ed. 2], 72 & 180. 1949; Moldenke, Alph. List Cit. 4: 1067 & 1113. 1949; Moldenke, Résumé 82 & 447. 1959.

Shrub or tree; branches stout and heavy, acutely tetragonal, corky, grayish; branchlets and twigs stout or slender, brown, acutely tetragonal, often margined, glabrous, often shiny; nodes annulate; principal internodes 1--6 cm. long; leaf-scars borne on tremendous, stout, corky, divergent sterigmata to 7 mm. long and 5 mm. wide; leaves decussate-opposite, often with 2 branchlets or twigs arising from one axil; petioles very stout, 3--12 mm. long, usually margined, glabrate; leaf-blades coriaceous, rather uniformly dark-green on both surfaces, the immature ones thinner and nigrescent in drying, elliptic, 4.2--13 cm. long, 1.7--7.5 cm. wide, acute or short-acuminate at the apex, sparsely serrate with very short teeth along the margins almost to the base or subentire, subcuneate at the base and prolonged into the petiole, often with a few scattered glands at or near the base beneath, glabrous on both surfaces; midrib stout, plane or subprominent above, very prominent beneath; secondaries slender, 4--10 pairs, usually quite irregular, arcuate-ascending, very slightly prominent or subimpressed above, prominent beneath; vein and veinlet reticulation abundant, prominent on both surfaces (uniformly so above, irregularly so beneath); racemes axillary and terminal, 7.5--20 cm. long, about 1.3 cm. wide during anthesis, erect or nutant, rather densely many-flowered, simple; peduncle and rachis slender, light-brown, more or less ribbed, glabrous, the former 1--1.5 cm. long; bracts and bractlets absent; prophylla setaceous, minute; pedicels slender, 1--2 mm. long, and glabrous, or obsolete; fruiting-calyx large, indurated, cupuliform, about 5.5 mm. long and 7 mm. wide, rather venose-ribbed, glabrous, its rim deeply but irregularly 5-lobed, the lobes acute or blunt at the apex; fruit drupaceous, oblong, about 7 mm. long and 6 mm. wide, somewhat fleshy, glabrous, shiny.

The type and only known collection of this species was made by August Weberbauer (no. 5916) somewhere in Apurimac, Peru, at an altitude of 3100 meters, between 1909 and 1914, and is deposited in the herbarium of the Chicago Natural History Museum. The species is said to grow in fields, blooming from April to June, and has been confused in herbaria with *C. reticulatum* H.B.K. In all, 5 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: PERU: Apurimac: Weberbauer 5916 (F--628976--type, G--isotype, N--isotype, N--photo of type, S--isotype, W--1495382--isotype, Z--photo of type).

CITHAREXYLUM SUBFLAVESCENS Blake, Proc. Biol. Soc. Wash. 35: 122--123. 1922.

Synonymy: *Citharexylum obtusum* Pittier ex Moldenke, Prelim. Alph. List Invalid Names 17, in syn. 1940. *Citharexylum robustum* Pittier ex Moldenke, Prelim. Alph. List Invalid Names 17, in syn. 1940. *Citharexylum tomentosum* Klotzsch & Karst. ex Moldenke, Prelim. Alph. List Invalid Names 18, in syn. 1940 [not *C.*

tomentosum Poir., 1811, nor H.B.K., 1817, nor Sessé & Moc., 1831].
Citharexylum subflabescens Blake, in herb.

Literature: Blake, Proc. Biol. Soc. Wash. 35: 122--123. 1922; Hill, Ind. Kew. Suppl. 7: 50. 1929; Moldenke, Geogr. Distrib. Avicenn. 19 & 20. 1939; Pittier, Supl. Pl. Usual. Venez. 54. 1939; Moldenke, Prelim. Alph. List Invalid Names 17 & 18. 1940; Moldenke, Alph. List Invalid Names 15. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, & 88. 1942; Moldenke, Castanea 10: 43. 1945; Moldenke, Alph. List Cit. 1: 193, 222, & 273. 1946; Moldenke, Phytologia 2: 334. 1947; Moldenke, Alph. List Cit. 2: 332, 352, 420, 447, & 603 (1948), 3: 749, 805, 819, 826, 833, & 974 (1949), and 4: 1001, 1019, 1044, & 1077. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, 158, & 180. 1949; A. L. & H. N. Moldenke, Anal. Inst. Biol. Mex. 20: 5. 1949; Moldenke, Résumé 66, 70, 215, 257, 258, & 447. 1959.

Low tree, to 30 m. tall; trunk short, to 60 cm. in diameter at the base or only 8 cm. in diameter at breast height; crown rounded; bark gray or pale-gray, smooth or flaky; branches, branchlets, and twigs very stout, acutely tetragonal, buff-gray or brown, densely or sparsely furfuraceous-tomentose with branched flavescent hairs or granulose-pulverulent, becoming griseous or sordid to glabrous and shiny in age, very medullose or hollow, often decussately ampliate and flattened at the nodes, the branchlets elliptic in cross-section; nodes not annulate; principal internodes elongated, 2.5--7 cm. long; pith white; leaf-scars borne on stout ascending sterigmata; leaves decussate-opposite or rarely approximate; petioles slender or stout, 2.7--6 cm. long, canaliculate beneath and often also above, usually flattened above or subtetragonal in cross-section, buff-gray when fresh, nigrescent in drying, pubescent like the branchlets or densely ochraceous-furfuraceous, often with myrmecophilous swellings at the apex; leaf-blades subcoriaceous or firmly thick-pergamentaceous, rather uniformly bright-green or dull olive-green above and buff-yellowish beneath, dull or subnitid above, ovate or oblong-ovate to ovoid-elliptic, 12--27 cm. long, 4--11.5 cm. wide, acute to attenuate or acuminate at the apex, entire but often somewhat sinuate and minutely revolute along the margins, rounded or subtruncate to broadly acute or cuneate at the base, apparently not glanduliferous, densely furfuraceous-pubescent with spreading olivaceous-yellowish branched hairs above when young, glabrescent and pale-green above except along the midrib and secondaries when mature, densely and persistently ochraceous-furfuraceous or pilose-tomentose with flavescent stellate hairs beneath; midrib stout, plane or impressed above, very prominent beneath; secondaries slender, 6--16 pairs, often rather close together, arcuate-ascending or the lower ones almost straight, obscure or impressed above, prominent beneath, confluent near the margins; vein and veinlet reticulation practically indiscernible above, prominulent or hidden by the pubescence beneath; inflorescence spicate; spikes axillary and terminal, solitary or often paired in the upper

axils, 9--30 cm. long, about 1.6 cm. wide, simple, erect or spreading to nutant, rather densely or loosely many-flowered; peduncles and rachis rather stout (in fruit often very stout), densely or sparsely ochraceous-furfuraceous, the former 0.7--2 cm. long; pedicels obsolete or to 1 mm. long in fruit; bracts none; bractlets few and linear or triangular, to 2.5 mm. long, tomentose-pubescent; prophylla setaceous, about 1 mm. long, densely furfuraceous; flowers sessile; calyx obovoid, 5--6 mm. long, densely pubescent like the branchlets, the teeth irregularly cohering in 2 or 3 groups, triangular, about 1 mm. long, obtuse or apiculate at the apex; corolla from white or whitish to dull olive-green, about 8 mm. long, externally essentially glabrous, densely barbate-pilose within from the level of the insertion of the stamens to the middle of the limb, the limb 5- or rarely 6-lobed, the lobes cuneate-flabellate, 2--2.5 mm. long, somewhat wavy-margined; perfect stamens 5 or rarely 6, inserted near the middle of the corolla-tube, included; filaments subulate, about 1.3 mm. long, glabrous; anthers linear-oblong, about 1.3 mm. long, obtuse at the apex; style bifid; ovary 4-celled; ovules solitary, erect; fruiting-calyx large, incrassate, indurated, cupuliform, about 8 mm. long and 9 mm. wide, rather venose-ribbed, minutely puberulent or glabrate, its rim 5-angulate; fruit drupaceous, obovate, about 1.5 cm. long and 1.1 cm. wide at its widest part, fleshy, shiny, glabrous, orange or red when fresh, wrinkled and 2-sulcate in drying.

The type of this species was collected by Frederick Wilson Popenoe (no. 1143) from trees cultivated on the streets of Bogotá, at an altitude of 2640 meters, Cundinamarca, Colombia, on October 11, 1920, and is deposited in the United States National Herbarium at Washington. The collector notes that the species is cultivated considerably as a street tree in Bogotá. Blake says "it is distinguished by its combination of long-petioled comparatively large leaves, densely flavescent-tomentose beneath, and its truly spicate pentandrous flowers. Only a few species with all the stamens perfect have been described, and from all of these *C. subflavescens* is clearly distinct."

The type of *C. robustum* was collected by Henri François Pittier (no. 9333) at Colonia Tovar, Aragua, Venezuela, on March 21, 1921, and is deposited in the Gray Herbarium at Harvard University.

In its wild state this species inhabits clearings, grass pastures, the margins of forests, and bushy rocky slopes, from 1800 to 2880 m. altitude. It has been collected in anthesis in May, September, October, and December, and in fruit in August. It has been confused by herbarium workers with *C. tomentosum* H.B.K. and with the genus *Cordia* L. of the *Ehretiaceae*.

Steyermark affirms that the tree is said to be poisonous to the skin and to cause dermal swellings and itching like those of poison-ivy (*Toxicodendron radicans*). Common names are "cuidadito" and "salvio". Bark specimens are preserved on the

sheets of Schultes, Jaramillo, & Gutiérrez 4054a. The Berlin sheets of Karsten s.n., cited below, are inscribed "Columbien", but Colonia Tovar, where they were collected, is definitely in what is now Aragua, Venezuela. Most of the Venezuelan material has come from this locality.

The species is closely related to C. montanum Moldenke, and the Pennell 2545 cited below may possibly be that species rather than C. subflavescens. Bernardi says "Madera resistente a la intemperie" and "especie aparentemente restringida a la region." In all, 56 herbarium specimens, including the types of all the names involved, and 10 mounted photographs have been examined.

Citations: COLOMBIA: Boyacá: Toro 27 (N). Cundinamarca: García y Barriga 13476 (W--2026285); F. W. Pennell 2545 (N); Schultes, Jaramillo Mejía, & Gutiérrez Villegas 4054a (W--1988710, W--1988711). Huila: E. L. Little 9029 (N). Valle del Cauca: Cuatrecasas 22407 (N). Department undetermined: Purdie s.n. [R. Courou] (K). VENEZUELA: Aragua: Fendler 1023 (Cb, Cb, Cb, Cb, D--611881, D--611882, E--119108, E--119109, E--119110, F--686706, G, G, G, K, K, N, N); Karsten s.n. [Colonia Tovar] (B, B, L, L, L, N, V--124270, V, V); Moritz 1777 (Bm, G, K, Ol, Ol, P, V); Pittier 9333 (B--photo, Cb, G, K--photo, N, N--photo, S--photo, Ve, Ve, W--42955, Z--photo). Mérida: Bernardi 2069 (N); Steyermark 56449 (F--1205144, N). CULTIVATED: Colombia: Gutiérrez Villegas s.n. [Julio 1947] (Fn--3121, Ms); García y Barriga 10501 (W--1830430); Popenoe 1143 (B--photo of type, G--isotype, K--photo of type, N--photo of type, S--photo of type, W--1067081--type, Z--photo of type).

CITHAREXYLUM SUBTHYRSOIDEUM Pittier, Contrib. Fl. Venez. 42--43. 1923.

Synonymy: Citharexylum subthyrsoideum Meissn., in herb.

Literature: Pittier, Contrib. Fl. Venez. 42--43. 1923; Hill, Ind. Kew. Suppl. 7: 50. 1929; Moldenke, Geogr. Distrib. Avicenn. 19 & 20. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, & 188. 1942; Moldenke, Alph. List Cit. 1: 198, 273, & 326 (1946), 2: 332, 411, 425, 427, & 631 (1948), 3: 818--820, 887, & 888 (1949), and 4: 1005, 1041, 1044, 1049, 1052, 1057, 1060, & 1064. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, & 180. 1949; Moldenke, Résumé 66, 70, & 447. 1959.

Shrub or small tree, to 5 m. tall; branches, branchlets, and twigs slender, gray or brown, acutely tetragonal, often more or less ribbed, glabrous; nodes annulate; principal internodes 1--7 cm. long; leaves decussate-opposite or approximate; leaf-scars borne on short ascending sterigmata to 3 mm. long; petioles very slender, 0.6--2.5 cm. long, glabrous; leaf-blades chartaceous, uniformly dark-green on both surfaces, lanceolate-oblong or elliptic, often conduplicate-falcate,

3.5--11.5 cm. long, 1.5--4 cm. wide, acute or acuminate at the apex, entire, acute at the base, often bearing 1 or 2 small glands at the very base beneath, glabrous or subglabrate on both surfaces, often more or less punctate beneath; midrib slender, subimpressed above, prominent beneath; secondaries slender, 4--7 pairs, arcuate-ascending, very slightly prominent on both surfaces; vein and veinlet reticulation delicate, slightly prominent above or often rather obscure; racemes numerous, axillary and terminal, the terminal ones often compound and thyrsoid with 1 or 2 pairs of lateral branches, each simple raceme 3--12 cm. long, about 1 cm. wide during anthesis, densely many-flowered, mostly nutant; peduncles and rachis very slender, minutely puberulent or glabrous, the former 1--2 cm. long or subobsolete; pedicels very slender, 1--2 mm. long, minutely pulverulent or glabrous; bracts absent; bractlets few or none, linear or oblong; prophylla setaceous, 1--2 mm. long, often conspicuous; flowers caducous; calyx campanulate, about 2.5 mm. long, persistent, 5-costate, glabrous or subglabrate externally, very minutely sericeous at the top inside, its rim 5-dentate, the margins ciliate; corolla white or greenish-white to yellow, its tube conic, about 4 mm. long, almost twice as long as the calyx, villosulous on the inner surface, densely villous in the throat, the lobes spreading, broadly ovate, about 2 mm. long and 1.5 mm. wide, rounded at the apex, glabrous externally, softly villous within; stamens 4, glabrous; filaments short, inserted at the middle of the corolla-tube; pistil about 3.5 mm. long, longer than the calyx, glabrous; style erect, about 1.5 mm. long; stigma about 0.3 mm. long, shortly 2-lobulate; ovary globose, about 1.7 mm. long; fruiting-calyx light and herbaceous, cupuliform, fragile, about 3 mm. long and 6 mm. wide, externally minutely pulverulent or puberulent, minutely pulverulent within, its rim subtruncate or shallowly 5-angulate; fruit drupaceous, oblong or ovoid, about 6 mm. long and 5 mm. wide, fleshy, glabrous, shiny, black and wrinkled in drying, 2-sulcate.

The type of the species was collected by Henri François Pittier (no. 7234) in light woods, altitude 1000 to 1200 meters, in the Lower Catuche woods above Caracas, Federal District, Venezuela, on July 8, 1917, and is deposited in the United States National Herbarium at Washington. It inhabits light woods, ravines, savannas, and bushy places in the hills. It has been collected in anthesis from May to September, and in fruit in August. The flowers are described as "deciduous" by Pittier. They apparently fall off very easily, as, indeed, they do in many members of this group, and seed-setting is therefore not abundant. Often only the terminal part of a fruiting raceme bears any fruit, although sometimes one finds fruit set to the base. The numerous small leaves and racemes, and tiny flowers, characterize this very constant species quite well. In the original description no type is designated and two numbers are cited -- no. 7234 as the basis of the floral characters and no. 9648 for the fruit characters. However, the original notes on

the Washington sheets indicate plainly that the former collection was Pittier's intended type. In all, 53 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: COLOMBIA: State undetermined: Triana 299 (Bm). VENEZUELA: Aragua: Fendler 842 (G, G, K). Federal District: H. M. Curran 269 (N); Eggers 13131 (Cp, F--689299, G, Le, W--1234565, W--1323226); Herb. Lugd.-Bat. 908266-140 (Le); Lasser 742 (Ve--12649); Pittier 7234 (B--photo of type, G--isotype, K--photo of type, N--photo of type, S--photo of type, Ve--12652--isotype, W-987359--type, Z--photo of type), 9645 (N), 9648 (Ba, Cb, G, P, Ve--12654, Vi, W--1069489), 12414 (A, B, Cb, Cb, D--636519, E--942330, Mu, N, N, Ve--12655, W--1344426), 13380 (A, Ca--735002, Cb, D--651400, E--983629, F--637368, Mu, N, Ve--12653, W--1472510); Van Landsberge 227 (Le, Le, Le, S). Lara: Saer 33 (Ve, W--1186273), 664 (Ve); Tamayo 3757 (N). State undetermined: González s.n. (Ve).

CITHAREXYLUM SUBTRUNCATUM Moldenke in Fedde, Repert. 37: 234--235. 1934.

Literature: Moldenke in Fedde, Repert. 37: 234--235. 1934; Hill, Ind. Kew. Suppl. 9: 67. 1938; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 88. 1942; Moldenke, Alph. List Cit. 1: 322. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 76 & 180. 1949; Moldenke, Résumé 88 & 447. 1959.

Tree, to 5 m. tall; branchlets and twigs stout, medullose or hollow, light-brown, obtusely tetragonal or 5-angled, triangular at the nodes, glabrate, sparingly lenticellate; nodes annulate, the annulations Ω -shaped, conspicuous; principal internodes elongate, 6--9 cm. long; leaf-scars borne on short, stout, ascending sterigmata; leaves ternate; petioles very stout, wrinkled in drying, 2.3--3.7 cm. long, flattened or sulcate above, ampliate at the base, weak, glabrous; leaf-blades firmly chartaceous or subcoriaceous, uniformly dark-green on both surfaces, broadly oblong, 11.5--16.5 cm. long, 6.2--8.3 cm. wide, acute at the apex, entire, subtruncate at the base but slightly prolonged into the petiole, bearing a pair of very large and prominent, black, crateriform glands on the prolongation, glabrous and rather shiny above, minutely pulverulent beneath; midrib stout, sharply prominent above, very prominent beneath; secondaries slender, 7--10 pairs, arcuate-ascending, rather regular, prominent on both surfaces; vein and veinlet reticulation abundant, prominent on both surfaces; racemes axillary, ternate, 10.5--17.5 cm. long, about 3 cm. wide in fruit, simple, erect or nutant, rather loosely many-flowered; peduncles and rachis slender, brown, very minutely puberulent, the former 2.2--4 cm. long; pedicels (in fruit) stout, 2--2.5 mm. long, minutely puberulent; bracts and bractlets apparently absent; prophylla minute, setaceous, inconspicuous; flowers not known; fruiting-calyx indurated, cupuliform, about 5 mm. long and 6 mm. wide, heavy, more or less rug-

ate, glabrate, its rim subtruncate, irregularly erose; fruit drupaceous, oblong or obovoid, about 13 mm. long and 8 mm. wide, rather slightly fleshy, glabrous and rather shiny, orange or yellow when fresh, brown and plainly 2-sulcate in drying.

The type of this species was collected by Bror Eric Dahlgren and Emil Sella (no. 685) at Belém, Pará, Brazil, between March and May, 1929, and is deposited in the herbarium of the Chicago Natural History Museum. It is plainly related to *C. myrianthum* Cham., *C. laetum* Hiern, and *C. amazonicum* Moldenke. It is said to be found on campos, fruiting in April, and is called "comida de pombo". In all, 5 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: BRAZIL: Amapá: Lobato & Lobato s.n. [Black 50-9543] (Be--55606). Pará: Black, Ledoux, & Stegemann 52-14337 (Be--74066); Dahlgren & Sella 685 (B--photo of type, F--602585--type, K--photo of type, N--isotype, N--photo of type, S--photo of type, Z--photo of type), 769 (F--603009).

CITHAREXYLUM SULCATUM Moldenke in Fedde, Repert. 37: 235--236. 1934.

Literature: Moldenke in Fedde, Repert. 37: 235--236. 1934; Hill, Ind. Kew. Suppl. 9: 67. 1938; Moldenke, Geogr. Distrib. Avicenn. 19. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31 & 88. 1942; Moldenke, Alph. List Cit. 1: 12, 132, 243, & 249. 1946; Daniel, Verb. Cent. Antioq. 5. 1947; Moldenke, Alph. List Cit. 2: 337 (1948), 3: 692, 694, 758, 805, 809, & 833 (1949), and 4: 1005, 1010, 1040, 1042, 1069, & 1075. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 180. 1949; Acosta Solis, Publ. Dept. Forest. Ecuador 7: 25. 1949; Moldenke, Résumé 66 & 447. 1959.

Small gnarled shrub, to 6 m. tall; trunk to 7 cm. in diameter at breast height; bark gray, slightly fissured; branchlets and twigs medium, stiff, gray or light-brown, acutely or obtusely tetragonal, lepticellate, puberulent on the younger parts, becoming glabrous and shiny, sometimes more or less furfuraceous-barbellate at or near the nodes or on the angles; nodes annulate; principal internodes 1--6.5 cm. long; leaf-scars borne on large, often massive, divergent, corky sterigmata to 7 mm. long and 4 mm. wide; leaves decussate-opposite; petioles stout, 4--15 mm. long, more or less furfuraceous-pubescent or puberulent, becoming glabrous and shiny, sulcate above; leaf-blades coriaceous, rather uniformly dark-green on both surfaces or lighter beneath, very shiny above, the immature ones becoming bruneous or nigrescent above in drying, elliptic-oblong or elliptic, 3.3--18.8 cm. long, 1.5--8.3 cm. wide, broadly acute at the apex, very sharply serrate along the margins with very small, very stiff, and sharply apiculate, rather widely separated, antrorse teeth almost to the base, or rarely subentire, broadly rounded or acute to subcuneate at the base, often more or less prolonged into the petiole and bearing a pair of obscure glands on the

prolongation beneath, glabrous above or puberulent along the midrib when immature, more or less furfuraceous-pubescent along the midrib and secondaries beneath when immature, soon becoming glabrous; midrib stoutish or slender, sharply prominulent within a channel above, very prominent beneath; secondaries slender, 5--8 pairs, impressed above or sharply prominulent in a channel, sharply prominent beneath, ascending at an angle of 45--75°, usually not much arcuate, plainly anastomosing; vein and veinlet reticulation beautifully prominulent on both surfaces when mature or subimpressed above; racemes axillary and terminal, erect or nutant, 4.5--25 cm. long, to 2.4 cm. wide during anthesis, loosely or rather densely many-flowered, simple; peduncles and rachis slender or stout, very stout in fruit, brown, densely furfuraceous or minutely puberulent to glabrous, the former 5--10 mm. long; pedicels slender, 1--2 mm. long; bracts and bractlets absent; prophylla minute, linear-setaceous, to 1 mm. long; calyx campanulate, about 4.1 mm. long and 3.9 mm. wide, glabrate, conspicuously 5-costate, its rim very shortly 5-apiculate; corolla infundibular, greenish-white or yellowish to light-green, its tube broadly cylindric, about 5.7 mm. long, about 1.5 mm. wide at the base and to 5 mm. wide at the apex, externally glabrous, densely pilose in the throat within, the limb 5-parted, the lobes subequal, rounded-lingulate, about 2.6 mm. long and 3.1 mm. wide, rounded at the apex; stamens 4, didynamous, inserted about 3.1 mm. below the mouth of the corolla-tube, included; filaments about 1 mm. long; anthers oblong, about 2 mm. long and 0.8 mm. wide, dorsifixed; pistil included; style thick, about 1.5 mm. long, pulverulent, broadened and merging into the ovary at the base; stigma minutely bilobed, the lobes about 0.5 mm. long, densely fimbriate; ovary obovate, about 1.3 mm. long, about 1.8 mm. wide at the apex, 4-celled; fruiting-calyx greatly indurated and incrassate, cupuliform, about 6 mm. long and 10 mm. wide, 5-ribbed, densely furfuraceous or glabrous and shiny, its rim more or less irregularly 5-lobed or -split; fruit drupeaceous, oblong or obovate, about 14 mm. long and 10 mm. wide, somewhat fleshy, glabrous, shiny, black and wrinkled in drying and 2-sulcate.

The type of this species was collected by Francis Whittier Pennell (no. 2029) on a bushy mountain-slope, at an altitude of 2900--3000 meters, at Chapinero, near Bogotá, Cundinamarca, Colombia, between September 18 and 23, 1917, and is deposited in the Britton Herbarium at the New York Botanical Garden. The leaves are quite holly-like. The specific name is given in allusion to the fact that the leaf-blades are so often decidedly sulcate above, with the midrib, secondaries, and larger venation impressed in distinct channels. Sometimes, however, the veins and veinlets are beautifully prominulent above. The entire venation is always sharply prominent or prominulent beneath.

The species inhabits bushy mountain-slopes, forests, and the area near the bottom of canyon-slopes, and has been collected

at altitudes of 2650--3300 meters, blooming in January, February, April, and October, and fruiting in June, July, and October. It is obviously very closely related to C. suberosum Loes., and has been confused by herbarium workers with C. ilicifolium H.B.K. It is said by Acosta Solis to be found in Chillanes, Bolívar, Ecuador, and there called "cogollo", but I have as yet seen no material from that country. Daniel says of it "En varios sitios, se conocen los arbustos catalogados bajo la denominación genérica de Citharexylum con el nombre de 'agracejos'".

Mutis 4373, cited below, is anomalous in its large leaves and racemes and in its much more copious furfuraceous pubescence throughout. Mostly the leaves of this species are only to 8 cm. long and 4 cm. wide, and the racemes to 15 cm. long. In all, 33 herbarium specimens, including the type, and 8 mounted photographs have been examined.

Citations: COLOMBIA: Antioquia: Ariste-Joseph A.263 (W--1038670). Boyacá: Pérez Arbeláez & Cuatrecasas 8175 (N). Cundinamarca: Ariste-Joseph A.117 (G, W--888323); Cuatrecasas 5469 (N, N), 7978 (W--1774232); Goudot 1 (P, X); Guatavito 1 (K); Haught 5638 (N, S); Little & Little 9201 (W--2140889); Mutis 861 (W--1561454), 900 (W--1561456), 2244 (W--1561463), 4177 (W--1561469), 4373 (W--1561455); F. W. Pennell 2029 (B--photo of type, K--photo of type, N--type, N--photo of type, S--photo of type, Z--photo of type), 2442 (G, N); Purdie s.n. [woods & hills near Bogotá] (G, K, K, K, P); Triana 2012 (Bm, V), 2042 (P), 2072 [Macbride photos 28398] (Cb, F--830270--photo, Kr--photo, N--photo); Troll 3674 (B, B). State undetermined: Triana 133 (K).

CITHAREXYLUM SVENSONII Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 76. 1942.

Literature: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 76, & 88 (1942) and [ed. 2], 69 & 180. 1949; Moldenke, Alph. List Cit. 4: 982. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 55. 1953; Moldenke, Résumé 79 & 447. 1959.

Shrub, to 3 m. tall; branches and branchlets acutely tetragonal, medullose, often longitudinally striate, glabrous, lenticellate; nodes annulate; principal internodes 2.5--7 cm. long; leaves decussate-opposite, borne on large, corky, appressed sterigmata; petioles slender, 12--15 mm. long, deeply canaliculate, glabrous; leaf-blades thin-chartaceous or submembranous, uniformly bright-green and shiny on both surfaces, not nigrescent in drying, elliptic, about 15 cm. long, 5.5--7 cm. wide, long-acuminate at the apex, entire, abruptly acute at the base, glabrous on both surfaces, very densely reticulate-veined, the venation prominulous on both surfaces, not glanduliferous; inflorescence terminal, paniculate, usually with about 2 pairs of branches near the base; peduncles slender, 5--6 cm. long, glabrous and acutely tetragonal like the branches; inflorescence-branches 7--15 cm. long, densely many-flowered, slender, glabrous or subglabrous;

flowers not known; fruiting-pedicels 1--2 mm. long, glabrate; fruiting-calyx campanulate, about 3 mm. long and wide, glabrous, its rim irregularly lobed; fruit fleshy, oblong, about 5 mm. long and 4 mm. wide, shiny, glabrous, 2-seeded.

The type of this species was collected by Henry Knute Svenson (no. 11457) -- in whose honor it is named -- on a riverbank at Manglaralto, Guayas, Ecuador, on April 12 or 13, 1941, and is deposited in the Britton Herbarium at the New York Botanical Garden. It is known thus far only from the type.

Citations: ECUADOR: Guayas: Svenson 11457 (N--type).

CITHAREXYLUM TECLENSE Standl., Field Mus. Publ. Bot. 8: 39--40. 1930.

Synonymy: Citharexylum calderonii Standl. ex Moldenke, Prelim. Alph. List Invalid Names 16, in syn. 1940.

Literature: Standl., Field Mus. Publ. Bot. 8: 39--40. 1930; Hill, Ind. Kew. Suppl. 8: 53. 1933; Moldenke, Alph. List Common Names 7. 1939; Moldenke, Geogr. Distrib. Avicenn. 16 & 36. 1939; Moldenke, Prelim. Alph. List Invalid Names 16. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 21, 71, & 88. 1942; Moldenke, Alph. List Invalid Names 14. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 89 & 321. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 52. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 38, 158, & 180. 1949; Moldenke, Résumé 45, 215, 255, & 447. 1959.

Tree; branchlets and twigs medium-slender, grayish or brown, sharply tetragonal, densely but minutely puberulent; nodes annulate; principal internodes 1.5--7.5 cm. long; leaf-scars borne on stout closely appressed sterigmata; leaves decussate-opposite; petioles slender, 4--7 mm. long, densely puberulent, sulcate above, margined; leaf-blades firmly chartaceous when mature, membranous when immature, rather dark grayish-green above, lighter beneath, the immature ones brunnescent in drying, broadly elliptic or subobovate, 8--13 cm. long, 2.5--7 cm. wide, broadly rounded or acute at the apex, entire, cuneate at the base, scabrous above, densely short-pubescent with brownish hairs beneath, marked with a few scattered glandular disks beneath and a pair of larger ones on the leaf-prolongation into the petiole; midrib slender, impressed above, prominent beneath; secondaries very slender, 5--12 pairs, arcuate-ascending, subimpressed above, prominulent beneath; vein and veinlet reticulation rather abundant, mostly obscure above or faintly subimpressed, prominulent but often hidden by the pubescence beneath; racemes terminal, nutant, simple, 4--13.5 cm. long, about 2 cm. wide during anthesis, very loosely many-flowered; peduncles and rachis slender, brown, densely puberulent with brown hairs, the former often to 3 cm. long and bearing numerous nodes with white-woolly buds, bracts, and bractlets; bracts often present, foliaceous, varying greatly in size, resembling the upper leaves; bractlets linear, to 7 mm. long, puberulent; prophylla elongate, linear, 2--4 mm. long; calyx campanulate, 5--6 mm. long, about 4 mm. wide,

very minutely puberulent, its rim obsoletely dentate, the teeth very broadly rounded and apiculate at the apex; corolla externally glabrous, its tube broad, 7—8 mm. long, the lobes oblong, 3—3.5 mm. long, thick-textured, rounded or retuse at the apex; fruiting-calyx large, herbaceous, about 7 mm. long and 9 mm. wide, minutely puberulent, not ribbed, its rim shallowly 5-lobed with broad and acute lobes; fruit drupaceous, subglobose, 12—14 mm. long.

The type of this species was collected by Salvador Calderón (no. 2529) at Finca La Joya, near Santa Tecla, La Libertad, El Salvador, on June 4, 1929, and is deposited in the herbarium of the Chicago Natural History Museum. The collector records the vernacular name "café de árbol", and states also that it is cultivated at Puerta de la Laguna. The very scabrous upper leaf-surfaces are characteristic. In all, 7 herbarium specimens, including the types of both names involved, and 5 mounted photographs have been examined.

Citations: EL SALVADOR: La Libertad: Calderón 2529 (B—photo of type, Bm—iso-type, F—592032—type, K—iso-type, K—photo of type, N—iso-type, N—photo of type, S—iso-type, S—photo of type, Z—photo of type). CULTIVATED: El Salvador: Calderón 2354 (F—598812, N).

CITHAREXYLUM TERNATUM Moldenke in Fedde, Repert. 37: 236—237. 1934.

Synonymy: Citarexylum ternatum Moldenke apud Alain in León & Alain, Fl. Cuba 4: 298 & 299. 1957.

Literature: Moldenke in Fedde, Repert. 37: 236—237. 1934; Hill, Ind. Kew. Suppl. 9: 67. 1938; Moldenke, Geogr. Distrib. Avicenn. 5. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24 & 88. 1942; Moldenke, Alph. List Cit. 1: 187. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 43 & 180. 1949; Alain in León & Alain, Fl. Cuba 4: 298 & 299. 1957; Moldenke, Résumé 51, 252, & 447. 1959.

Shrub or tree; branchlets and twigs slender, brown, more or less 5-angled, many-ribbed, obscurely pulverulent or glabrous; nodes annulate, the annular ring ciliate on young twigs; principal internodes 2—5 cm. long; leaf-scars borne on rather stout, short, ascending sterigmata; leaves ternate; petioles slender, 1—1.5 cm. long, glabrous or subglabrate, canaliculate above; leaf-blades firmly chartaceous, dark-green and very shiny above, dull-green beneath, narrowly oblong-elliptic or oblong, 6.5—10.5 cm. long, 2.4—3.1 cm. wide, bluntly acuminate at the apex, entire, acuminate at the base and prolonged into the petioles, bearing a pair of large black glands on the prolongation beneath, glabrous on both surfaces; midrib slender, sharply prominent in a channel above, prominent beneath; secondaries very slender, 5—9 pairs, arcuate-ascending, usually plainly anastomosing, prominent on both surfaces; vein and veinlet reticulation fine, prominent on both surfaces; racemes numerous, ternate, elongate, simple or bifurcate almost at the apex,

7—26 cm. long, 1—1.5 cm. wide, loosely many-flowered, erect or nutant; peduncles and rachis very slender, more or less ribbed, brown or stramineous, glabrous, the former 0.5—4.5 cm. long, often with 1 or 2 nodes bearing buds and bractlets; bractlets few or none, linear, to 5 mm. long; pedicels about 1 mm. long; prophylla setaceous, about 1 mm. long; calyx tubular, slightly zygomorphic, 3.1—3.6 mm. long, about 2.1 mm. wide, 5-costate, glabrous, its rim very shortly 5-dentate and obsoletely ciliate; corolla infundibular, its tube broadly cylindric, straight, about 3.9 mm. long, uniformly 2.1 mm. wide, externally glabrous, densely tomentose in the throat within, the limb 5-parted, the lobes ovate-lingulate, unequal in size, about 2 mm. long and 1.8 mm. wide, pubescent on the inner surface, rounded at the apex; fertile stamens 4, included, two inserted about 2.6 mm. and the other two about 2.3 mm. below the mouth of the corolla-tube; filaments about 1 mm. long; anthers ovate, about 1 mm. long and 0.5 mm. wide, dorsifixed; staminode small, about 0.3 mm. long; pistil included; style rather thick, about 1.8 mm. long, glabrous; stigma to 0.7 mm. wide, very shortly bilobed; ovary obovate, about 1.5 mm. long and wide, glabrous; fruiting-calyx light, shallowly cupuliform, about 3 mm. long and 5 mm. wide, glabrate, venose-ribbed, its rim subtruncate or erose; immature fruit subglobose, about 5 mm. long and wide, fleshy, wrinkled and 2-sulcate in drying.

The type of this species was collected by Erik Leonard Ekman (no. 14727) in the forest at Loma Vigia, Nagua, Oriente, Cuba, on August 4, 1922, and is deposited in the Britton Herbarium at the New York Botanical Garden. It was originally confused with the related C. tristachyum Turcz. Thus far it is known only from the type specimen. Only it and 5 mounted photographs have been examined.

Citations: CUBA: Oriente: Ekman 14727 (B—photo of type, K—photo of type, N—type, N—photo of type, S—photo of type, Z—photo of type).

CITHAREXYLUM TETRAMERUM T. S. Brandeg., Univ. Calif. Publ. Bot. 3: 390. 1909.

Literature: T. S. Brandeg., Univ. Calif. Publ. Bot. 3: 390. 1909; Prain, Ind. Kew. Suppl. 4: 49. 1913; Moldenke, Geogr. Distrib. Avicenn. 14. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16, 80, & 88. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 3. 1943; Paray, Bol. Soc. Bot. Mex. 1: 5. 1944; Moldenke, Alph. List Cit. 1: 252, 309, & 310 (1946), 2: 419 & 499 (1948), 3: 834 (1949), and 4: 1038. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 180. 1949; Rzedowski, Ciencia 15: 150 & 152. 1955; Rzedowski, Anal. Inst. Biol. Mex. 27: 197 & 199. 1956; Moldenke, Résumé 35 & 447. 1959.

Large shrub; branches and branchlets stout, woody, obtusely tetragonal or sometimes almost subterete, grayish, twiggy, obscurely puberulent or glabrate; twigs slender, gray, densely puberulent, often incanous when very young; nodes not annulate;

principal internodes extremely abbreviated, 1--7 mm. long, on larger branches to 18 mm. long; leaf-scars sessile, very small; leaves decussate-opposite, extremely numerous and close together; petioles to 1 mm. long or obsolete; leaf-blades firmly chartaceous, uniformly dark-green on both surfaces, oblong-oblan-ceolate, 2--4 cm. long, 4--8 mm. wide, blunt or acute at the apex, entire and usually more or less revolute along the margins, cuneately attenuate at the base, apparently not glanduliferous, glabrous on both surfaces and more or less impressed-punctate (especially beneath); midrib slender, plane or subimpressed above, prominent beneath; secondaries about 8 pairs, mostly obscure or indiscernible, occasionally impressed above; vein and veinlet reticulation indiscernible; racemes abbreviated, axillary, numerous, 1--3-flowered; peduncles 1--3 mm. long, incanous-puberulent, very slender; rachis obsolete; pedicels very slender, 1 mm. long or obsolete; bracts and bractlets none; prophylla linear-setaceous, 1--2 mm. long, incanous-puberulent; calyx cupuliform, about 2.5 mm. long, glabrous, its rim 4-sinuate-dentate; corolla white, 4--5 mm. long, pubescent, pilose in the throat, its limb 4-parted; stamens 4; fruit globose, 3--4 mm. wide.

The type of this very characteristic species was collected by Carl Albert Purpus (no. 2973) on rocky slopes at Cerro de Mazize, Puebla, Mexico, in July, 1907, and is deposited in the University of California herbarium at Berkeley. It is known only from the type locality, from the vicinity of San Luis Tultitlanapa, Puebla, near Oaxaca, and from "San Martín". The last-mentioned locality could be in Chiapas, Chihuahua, Coahuila, Durango, Guerrero, Hidalgo, Jalisco, México, Michoacán, Nuevo León, San Luis Potosí, Vera Cruz, or Zacatecas, as there is a San Martín in each of these states. However, my good friend and colleague, Dr. Maximo Martínez, in a letter to me dated May 5, 1945, tells me that there is a San Martín Texmelucan in the state of Puebla, so I am assuming that this is the locality where Hahn collected his material of the species.

Ladislao Paray, in the reference listed above, records the species from 50 km. northeast of Ixmiquilpan, in the state of Hidalgo, but I have as yet seen no material of it from that state. He says: "La vegetación arbórea se caracteriza por al anacahuite (Cordia boissieri). Abundan Morkellia mexicana (=Manto de coyote). Cera de los manantiales crecen los Citharexylum tetramerum de la familia de las Verbenáceas, la Chiococca alba y la Vallesia glabra."

The species was recorded by me in 1939 and 1942 as from the state of Oaxaca, but this was due to a faulty reading of a herbarium label, and the record was deleted in the 1942 edition of my work on the geographic distribution of the members of the group. The species has been collected in anthesis in July. In all, 18 herbarium specimens, including the type, and 9 mounted photographs have been examined.

Citations: MEXICO: Puebla: Hahn s.n. [S. Martín, 3 about 1865]

(N, P, P); Purpus 2973 [July 1907] (B--isotype, Ca--112960--type, E--photo of type, F--224008--isotype, K--photo of isotype, N--isotype, N--photo of type, N--photo of isotype, S--photo of type, S--photo of isotype, W--photo of type, Z--photo of type, Z--photo of isotype), 2973 [July 1908] (B, Bm, Ca--139931, Cb, E--119065, Ed, F--243782, G, N, P, W--840717).

CITHAREXYLUM TRISTACHYUM Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (3): 209--210. 1863.

Synonymy: Citharexylum urbanii O. E. Schulz in Fedde, Repert. 5: 193--194. 1908. Citharexylum tetrastachyum Urb. ex Roig, Est. Exp. Agron. Santiago Vegas Bol. 54: 340. 1928. Citharexylum tristachyon Turcz. ex Roig, Est. Exp. Agron. Santiago Vegas Bol. 54: 794. 1928. Citharexylum tetrastichum Urb. ex Moldenke, Prelim. Alph. List Invalid Names 18, in syn. 1940. Citharexylum tetrastachyum Urb. ex Roig, Dicc. Bot. 2: 1003. 1953. Citharexylum tristachyon Britton & Wilson ex Roig, Dicc. Bot. 1: 608. 1952. Citharexylum tristachyum Turcz. ex Alain in León & Alain, Fl. Cuba 4: 301. 1957. Citharexylum urbanii O. E. Schulz ex Alain in León & Alain, Fl. Cuba 4: 301, in syn. 1957. Citharexylum urbani O. E. Schulz ex Moldenke, Résumé 259, in syn. 1959.

Literature: Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (3): 209--210. 1863; Jacks., Ind. Kew. 1: 550. 1893; O. E. Schulz in Fedde, Repert. 5: 193--194. 1908; O. E. Schulz in Urb., Symb. Antill. 6: 66--67. 1909; Prain, Ind. Kew. Suppl. 4: 49. 1913; Roig, Est. Exp. Agron. Santiago Vegas Bol. 54: 340, 793, & 794. 1928; Grey & Hubbard, List Pl. Atkins Instit. 56. 1933; Moldenke, Alph. List Common Names 14, 18, 21, & 26. 1939; Moldenke, Geogr. Distrib. Avicenn. 5, 6, 8, & 36. 1939; Moldenke, Prelim. Alph. List Invalid Names 18. 1940; Moldenke, Suppl. List Common Names 1 & 16. 1940; Moldenke, Alph. List Invalid Names 15. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24, 25, 27, 71, & 88. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 60, 75, 79, 135, 136, 179, 184, 185, 199, 258, 261, 273, 303, 306, & 314 (1946) and 2: 332, 335, 358, 419, 435, 486, 487, 524, 528, 543, 550, 558, 569, 578, 579, & 646--651. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 87. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 43, 46, 50, 158, & 180. 1949; Moldenke, Alph. List Cit. 3: 664, 713, 720, 779, 809, 833, 889, 929, & 930 (1949) and 4: 1017, 1018, 1057, 1065, 1080, 1103, 1143, 1206, 1255, & 1289. 1949; Moldenke, Phytologia 3: 465. 1951; Alain in León & Alain, Fl. Cuba 4: 299 & 301. 1957; Moldenke, Résumé 51, 55, 59, 215, 252, 258, 259, & 447. 1959.

Varying from large bush or small shrub to tree, to 7 m. tall; branchlets slender, stramineous, lenticellate, obtusely tetragonal, glabrous; twigs slender, brown, often acutely tetragonal and many-ribbed, glabrous and shiny or more or less puberulent at the apex; nodes obscurely annulate; principal internodes 1--5 cm. long; leaf-scars borne on short, slender, corky, rather obscure

sterigmata; leaves decussate-opposite; petioles very slender, 7--22 mm. long, minutely puberulent or pulverulent to glabrous, canaliculate above; leaf-blades chartaceous, rather uniformly dark-green on both surfaces, often rather shiny above, broadly lanceolate or ovate, 4--15 cm. long, 1.8--3.9 cm. wide, sometimes slightly falcate at the apex, acuminate at the apex, entire, broadly acute or cuneate at the base, glabrate above (or puberulent-pubescent when immature), densely puberulent or short-pubescent beneath (especially on younger leaves and along the midrib) or merely pulverulent to glabrous, usually not glanduliferous but sometimes bearing 1 or 2 black glands on a prolongation into the petiole beneath; midrib slender, often subimpressed above, prominent beneath; secondaries slender, rather few and distant, 3--5 pairs, arcuate-ascending, usually prominulent on both surfaces; vein and veinlet reticulation fine, often obscure on both surfaces, especially above; racemes axillary and terminal, mostly compound, sometimes simple, most often with a pair of lateral branches much shorter than the central one, 3.5--15 cm. long, each branch usually about 1 cm. wide during anthesis, 1--1.5 cm. wide in fruit, rather densely many-flowered, numerous, mostly erect; peduncles and rachis very slender, glabrous or subglabrate, the former 1--1.5 cm. long, often nodose; pedicels filiform, 1--1.5 mm. long, glabrate; bracts (when present) foliaceous and similar to the leaves but smaller, few; bractlets linear, 1--2 cm. long; prophylla linear, 1--1.5 mm. long; flowers erectopatent; calyx obconic or infundibular, about 2.5 mm. long, externally tomentulose or glabrous, its rim truncate, plainly 5-dentate or 5-repand-dentate, ciliate; corolla subhypocrateriform or subcampanulate, yellow or yellowish to yellowish-green or pale yellowish-green, sometimes white, externally glabrous, villous in the throat within, its lobes suborbicular or broadly oblong, $1/3$ to $1/5$ the length of the entire corolla; stamens 4; filaments 0.5 mm. long; anthers 0.5--1 mm. long; staminode very rudimentary; pistil 2.5--3 mm. long; style 1--1.5 mm. long, merging at the base into the ovary; stigma bilobed, conspicuously wider than the style; ovary obovate or ellipsoid; fruiting-pedicels about 1.5 mm. long; fruiting-calyx light, cupuliform, about 2.5 mm. long and 4 mm. wide, pulverulent or very lightly puberulent, its rim broadly 5-angulate or subtruncate; fruit drupaceous, subglobose or obovate, 3--7.5 mm. long, to 5 mm. wide, fleshy, black and wrinkled in drying, obtuse at the apex, glabrous and very shiny; pyrenes bilocular.

The type of this species was collected by Jean Jules Linden (no. 2173) near Nimanima, "prov. Santiago", Oriente, Cuba, at an altitude of 2000 feet. The type of *C. urbanii* was collected by William Harris (no. 6724) in Green Valley, Jamaica, on October 9, 1896, and is deposited in the herbarium of the Botanisches Museum at Berlin. This latter type collection has the lower leaf surfaces densely short-pubescent, especially along the midrib. A similar condition is seen in *McFadyen s.n.*, *Ekman 7859*, and *Or-*

cutt 3144. The Ekman collection was identified by Schulz himself as C. tristachyum and the Orcutt number as C. berterii Spreng. [= C. caudatum L.]. León & Roca 7837 prove the conspecificity of C. urbanii and C. tristachyum -- the younger leaves toward the apex of the twigs, although almost the same size as the lower leaves, are densely short-pubescent beneath and puberulent above, while the lower leaves are perfectly glabrous on both surfaces. Hart 640 exhibits much the same condition, although here the pubescence is confined to the lower surface on the younger (upper) leaves.

The species has been found on limestone hills and hillsides, in valleys, thickets, pastures, and road cuts, at the foot of cliffs, and in coastal thickets. It has been collected in anthesis in January, April, May, and from July to October, and in fruit in January and from July to September, at altitudes of sea-level to 950 meters. It has been confused in herbaria with C. berterii, C. caudatum, C. longiflorum Turcz., and even with Gonzalagunia brachyantha (Rich.) Urb. in the Rubiaceae. Curbelo reports that its wood is employed in Cuba. Clément 278 exhibits one branch with ternate leaves. Common names recorded for the species are "agracejo", "guayo blanco", "guayo roble", "la calerio", "maíz de la Indias", "mari de las Indias", "mavi de las Indias", "palo blanco", and "roble guayo". The name "agracejo" is probably recorded for this plant erroneously, as it is a name applied commonly in Colombia to members of this genus, notably to C. dawei Moldenke, C. karsteni var. lanceolatum Moldenke, and C. fruticosum L.; "palo blanco" is probably also recorded here in error -- it applies to C. karsteni var. lanceolatum, C. tomentosum H.B.K., and Rehdera penninervia Standl. & Moldenke.

The Eggers 5453 collection cited below may have been collected in Las Villas instead of in Oriente -- its label merely reads "Caimanera".

The species is cultivated at Santa Clara, Cuba, according to Grey & Hubbard in their work listed above; it was collected in cultivation by J. G. Jack in the Havana Botanic Garden and also by him at Limones, Cuba, in 1929. It is cultivated also at the Coconut Grove, Florida, Plant Introduction Garden, the seeds having been presented by Robert M. Grey through F. G. Walsingham from Soledad, Cuba. In all, 162 herbarium specimens, including the types of all the names involved, and 17 mounted photographs have been examined.

Citations: CUBA: Camagüey: Acuña 13782 (Es), s.n. [Herb. Roig 3787] (Es), s.n. [Herb. Roig 8812] (Es). Las Villas: Alain 6375 (Ok); Cuesta 212 (N); Hodge, Howard, & Godfrey 4463 (G), 4704 (G); R. A. Howard 5650 (N, N, Um-48511); Jack 7462 (B, F--719811, L, N, W--1478091), 7470 (A, N), 7477 (A, B, F--720147, N, S, W--1478248), 7478 (A, B, F--720148, S, W--1478247); León

4107 [Herb. Roig 5784] (Es), 7837 (Ha, N), 13954 (Um--99), 14031 (Ha, N); León & Clément 5437 (Ha, N), 6683 (Ha, N); León & José 4107 (Ha, N); León & Roca 7837 (N); Shafer 12086 (N, N); Walsingham s.n. [Nov. 15, 1934] (N). Oriente: Acuña 17170 (Es); Acuña & Diaz Barreto 17441 (Es, N); Alain & Chrysogone A. 1075 (N); Alain & Morton 5038 (Ss); Bucher 40 [Herb. Roig 4937] (Es); Clément 278 (Ha), 2849 (Ha, N), 2851 (Ha, N); Curbelo 539 [Herb. Roig 5286] (Es); Eggers 5453 (A, B, B, K, Lu--1699, P, Vu, W--1323227); Ekman 1509 (N--photo, S, Z--photo), 3301 (N, S), 4874 (S), 7378 (B, N, S), 7538 (B, S), 7859 (B, S), 8019 (B, S), 8734 (B, S); Hioram 1574 (Ha, N, Se--14920), 4196 (Ha, N, N), s.n. [Finca San Francisco] (Ha); Hioram & Btiste 1574 (N); León 3914 (Ha, N), 11856 (Ha), 12234 (Ha, N), 12235 [Herb. Roig 5876] (Es, Ha), 14748 (Ha), 17714 (Ha); León & Alain 18915 (Ha, N); León & Victoran 18686 (Ha, N); Linden 2173 (B--photo of isotype, Cb--isotype, K--photo of isotype, N--photo of isotype, P--isotype, S--photo of isotype, Z--photo of isotype); López Figueiras 1039 (Z); Shafer 7937 (N); C. Wright 437 [1856--7] (Br, Cb, Cb, D--611744, E--119069, F--686765, G, K, N, Os, X), 1356 [Jan.--Jul. 1859] (G, K), 1356 [1860] (B, B, Cb, D--610678, E--119070, Os, P, X). Province undetermined: Sagra s.n. (P). JAMAICA: N. L. Britton 48 (N); W. Harris 6724 (B, B, B--photo, E--photo, F--145894, F--185311, K--photo, N, N, N--photo, N--photo, S--photo, S--photo, W--photo, Z--photo, Z--photo); Hart 640 (F--393694, N, N, W--1323184); Herb. W. Hooker s.n. (P); Hooker s.n. [1843] (K); Masson s.n. (Bm); Mc Fadyen s.n. (K, K, Le); Orcutt 3144 (W--1478330), 3511 (W--1478358); J. E. Perkins 1193 (K); Purdie s.n. [Port Royal Mountains] (K); Yuncker 18324 (S). VIRGIN ISLANDS: St. Thomas: Herb. Ventenat s.n. (Cb). CULTIVATED: Cuba: Jack 8265 (A, Ba, W--1555887). Florida: Fennell 1030 [U. S. Plant Introd. 90904] (Oa--14099), s.n. [Coconut Grove Introd. Gard.; U. S. Plant Introd. 101245] (Ar--3264); Fennell & Jones 790 (Ar--17155). Java: Herb. Mus. Hort. Bot. Bogor. XI.G.18 (Bz--25785, Bz, Bz, Bz, N).

CITHAREXYLUM ULEI Moldenke in Fedde, Repert. 37: 237. 1934.

Literature: Moldenke in Fedde, Repert. 37: 237. 1934; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 88. 1942; Moldenke, Alph. List Cit. 1: 167 (1946) and 2: 337, 343, & 622. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 87. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 76, & 180. 1949; Moldenke, Phytologia 3: 133 & 134. 1949; Moldenke, Alph. List Cit. 3: 694 (1949) and 4: 1014 & 1015. 1949; R. E. Schultes, Bot. Mus. Leaflets Harvard 16 (4): 90. 1953; Moldenke, Résumé 66, 88, & 447. 1959.

Small tree, to 15 m. tall; branches very stout and robust, stramineous, subterete, conspicuously lenticellate with very num-

erous small lenticels, hollow, glabrous; twigs more slender, brown, hollow, lenticellate, obtusely tetragonal, glabrate; nodes conspicuously annulate; principal internodes 3--4.5 cm. long; leaf-scars borne on rather stout, prominent and ascending sterigmata; leaves ternate throughout; petioles stout, 1.5--2.5 cm. long, glabrous, canaliculate above, ampliate at the base; leaf-blades very firmly chartaceous, oblong or elliptic, 13.5--20 cm. long, 4.1--7.5 cm. wide, blunt or acute at the apex, entire, broadly rounded or acute at the base and prolonged 5--7 mm. into the petiole, bearing a pair of very large crateriform glands on this prolongation, very minutely and obscurely puberulent-roughened or glabrate above, very minutely puberulent beneath and hirtellous along the larger venation; midrib stout, sharply prominent above, very prominent beneath; secondaries slender, 8--10 pairs, arcuate-ascending, plane or very slightly prominulent above, decidedly prominulent beneath; vein and veinlet reticulation very abundant, not very prominulent; racemes axillary and terminal, simple and ternate when axillary, compound and thyrsoid when terminal, the simple ones 5--37 cm. long, about 1.5 cm. wide during anthesis, rather densely many-flowered, erect or nutant, the terminal ones with 1--3 whorls of branches; peduncle and rachis very slender, minutely puberulent, the former 1--3 cm. long, not nodose; pedicels obsolete or to 1 mm. long; bracts absent; bractlets linear, in the terminal inflorescence only and there subtending the branches, 5--7 mm. long, canescent-puberulent; prophylla minute, setaceous, often almost indiscernible; calyx tubular, light, about 2.8 mm. long and 1.6 mm. wide, minutely pulverulent, not costate, the rim truncate and subentire; corolla white, hypocrateriform, its tube almost straight, about 6.2 mm. long, about 0.8 mm. wide at the base, widened to 1.8 mm. at the apex, externally glabrous, densely short-pilose in the throat within, the limb 5-parted, the lobes elongate-oblong, about 2.8 mm. long and 1.3 mm. wide, obtuse at the apex; stamens 5, didynamous, equaling the corolla-tube, two inserted about 1.3 mm. and the other three about 1.5 mm. below the mouth of the corolla-tube; filaments about 1 mm. long; anthers about 1.3 mm. long and 0.5 mm. wide; pistil included; style rather thick, about 2.3 mm. long, glabrous; stigma about 0.6 mm. wide, very shortly bilobed; ovary obovate, about 0.8 mm. long and wide, glabrous; fruiting-calyx indurated, shallowly cupuliform, about 2.5 mm. long and 5 mm. wide, obscurely puberulent or glabrate, its rim irregularly erose; fruit oblong, about 7 mm. long and 5 mm. wide, red, not very fleshy, brown and 2-sulcate in drying, dull, glabrous.

The type of this species was collected by Ernst Heinrich Georg Ule (no. 9724) on the riverbank at Seringal São Francisco on the Rio Acre, Amazonas, Brazil, in April, 1911, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The collector describes it as a tree 5--15 m. tall. It has been collected in flower in April, and in fruit in May. A common name for it is "cauchillo". Schultes states that the species occurs

"right up to the base of the Andes in Colombia". It was listed in error from *Matto Grosso* by me in my 1939 publication cited above. It has also been collected at Cachoeira on the Rio Jurua. It is obviously closely related to *C. amazonicum* Moldenke and *C. subtruncatum* Moldenke. It has been confused in herbaria with *C. cinereum* L. and *C. poeppigii* Walp. In all, 18 herbarium specimens, including the type, and 7 mounted photographs have been examined.

Citations: COLOMBIA: Putumayo: *R. E. Schultes* 3388 (N). BRAZIL: Amazonas: *Ducke* 470 (F-901838, S, N, W-1693474); *Krukoff* 4600 (N, N); *Ule* 5501 [Macbride photos 28399] (B, Cb, F-830252-photo, K, Kr-photo, Le, N, N, N-photo), 9724 (B-isotype, B-photo of type, Cb-isotype, Cb-isotype, K-type, Le-isotype, N-photo of type, S-photo of type, Z-photo of type).

CITHAREXYLUM ULEI var. *CALVESCENS* Moldenke, *Phytologia* 2: 363-364. 1947.

Literature: Moldenke, *Phytologia* 2: 363-364. 1947; Moldenke, *Alph. List Cit.* 4: 1294. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 76 & 180. 1949; Moldenke, *Résumé* 88 & 447. 1959.

This variety differs from the typical form of the species in not having its leaf-blades hirtellous along the larger venation beneath.

The type of the variety was collected by Ricardo de Lemos Fróes (no. 1719) near the river, Candido Mendes, in the Maracassumé River region, Maranhão, Brazil, on May 2, 1932, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collector describes it as a tree 20 feet tall, with whitish flowers, and records the vernacular name of "tarumá branco" -- a name also recorded for *C. laetum* Hiern, with which I at first confused the plant. Only 3 herbarium specimens have been examined.

Citations: BRAZIL: Maranhão: *Fróes* 1719 (La-isotype, N-type, S-isotype).

CITHAREXYLUM VALLENSE Moldenke, *Phytologia* 2: 15-16. 1941.

Literature: Moldenke, *Phytologia* 2: 15-16. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 31 & 88. 1942; Moldenke, *Alph. List Cit.* 2: 610 (1948) and 4: 1074. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 59 & 180. 1949; E. J. Salisb., *Ind. Kew. Suppl.* 11: 55. 1953; Moldenke, *Résumé* 66 & 447. 1959.

Tree, to 8 m. tall; branchlets very coarse and heavy, sharply tetragonal, decussately flattened and ampliate at the nodes, margined, densely pulverulent-farinose when young, glabrescent in age; nodes plainly annulate with a circumferential ridge; principal internodes 3-6 cm. long (at the tips of the branchlets); leaves decussate-opposite; petioles heavy, about 5 cm. long, pulverulent-farinose, glabrescent in age; leaf-blades

coriaceous, dark-green above, lighter beneath, ovate, about 30 cm. long, 10—12 cm. wide, acute or short-acuminate at the apex, entire, acute at the base and there bearing 2 large black glands parallel to the midrib, very sparsely pulverulent along the midrib and larger veins on both surfaces, glabrescent in age; midrib heavy, flat or subimpressed above, very prominent beneath; secondaries slender, about 15 per side, flat above, sharply prominent beneath, arcuate-ascending, conspicuously joined in many loops near the margins; veinlet reticulation obscure or indiscernible above, prominulous beneath; inflorescence spicate, axillary, 8—15 cm. long, densely many-flowered; peduncles (1—2 cm. long) and rachis very stout, very densely furfuraceous with sordid grayish or buff-colored furf, less densely so in age; pedicels obsolete; prophylla tiny, scale-like, 1—1.5 mm. long, densely furfuraceous farinose; calyx tubular, coriaceous, heavy, 6—8 mm. long, 4—5 mm. wide, densely furfuraceous-farinose with sordid grayish or buff-colored furf; corolla white, barely protruding from the calyx, its limb 5-parted, the lobes elliptic-lingulate, about 3 mm. long, densely pilose at the base.

The type of this species was collected by Ellsworth Paine Killip and Hernando García y Barriga (no. 33940) in a dense forest at San Antonio, west of Cali, near the summit of the Cordillera Occidental, at an altitude of 1900—2350 meters, between February 26 and March 2, 1939, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collectors note that it is a tree 7—8 m. tall. It has been confused in the past with the closely related C. montanum Moldenke. Only two specimens have been examined.

Citations: COLOMBIA: Valle del Cauca: Killip & García 33940 (N—type, W—1770798—isotype).

CITHAREXYLUM VENEZUELENSE Moldenke in Fedde, Repert. 37: 237—238. 1934.

Literature: Moldenke in Fedde, Repert. 37: 237—238. 1934; Hill, Ind. Kew. Suppl. 9: 67. 1938; Moldenke, Geogr. Distrib. Avicenn. 20. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 88. 1942; Moldenke, Alph. List Cit. 1: 198. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62 & 180. 1949; Moldenke, Résumé 70 & 447. 1959.

Shrub or tree, to 4 m. tall; branches tetragonal; branchlets and twigs rather slender, light-gray, rather acutely tetragonal, glabrous; nodes obscurely annulate; principal internodes 1—4.4 cm. long; leaf-scars borne on very large, extremely prominent, ascending or subdivergent, corky sterigmata to 5.5 mm. long; leaves decussate-opposite; petioles rather stoutish, 5—7 mm. long, glabrate, sometimes glanduliferous; leaf-blades chartaceous, dark-green, mostly darker beneath, subnitid above, oblong, 10—12.5 cm. long, 3.9—4.4 cm. wide, acute or very shortly and abruptly acuminate at the apex, entire, acute or subacuminate at the base, usually bearing a pair of glands at the very base or on the apex of the petiole, glabrous above, densely short-

pubescent beneath; midrib slender, prominent beneath; secondaries slender, 5--7 pairs, ascending at an angle of 45° , not much arcuate except toward the margin, subimpressed or plane above, prominent beneath; vein and veinlet reticulation rather abundant, slightly prominent on both surfaces; inflorescence and flowers not known; fruiting-calyx very much incrassate and indurated, shallowly cupuliform, about 4 mm. long and 7 mm. wide, glabrous or minutely puberulous on the rim, its rim irregularly erose; fruit large, oblong, about 17 mm. long and 10 mm. wide, fleshy, glabrous, dull, brown in drying.

The type of this little-known species was collected by August Fendler (no. 1298) between Caracas and La Guayra, Federal District, Venezuela, at an altitude of about 1000 feet, on August 16, 1855, and is deposited in the Gray Herbarium of Harvard University. The fruiting-calyx is like that of *C. solanaceum* Cham., and the fruit has been collected in August and October. The printed labels accompanying the type collection bear the words "Prope coloniam Tovar", and this is the basis for my previous accrediting this species to the state of Aragua, apparently erroneously. In all, only 2 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: VENEZUELA: Federal District: Fendler 1298 (B--photo of type, G--type, K--photo of type, N--photo of type, S--photo of type, Z--photo of type). State undetermined: Lasser 2104 (Ve).

CITHAREXYLUM VIRIDE Moldenke in Fedde, Repert. 37: 238--239. 1934.

Literature: Moldenke in Fedde, Repert. 37: 238--239. 1934; Hill, Ind. Kew. Suppl. 9: 67. 1938; Standl., Field Mus. Publ. Bot. 18: 1002. 1938; Moldenke, Alph. List Common Names 9. 1939; Moldenke, Geogr. Distrib. Avicenn. 17. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 23, & 88. 1942; Moldenke, Phytologia 2: 97. 1944; Moldenke, Alph. List Cit. 1: 58, 123, & 319 (1946), 2: 340, 349, & 431 (1948), 3: 757 (1949), and 4: 1055, 1098, & 1120. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39, 40, & 180. 1949; Moldenke, Phytologia 4: 68. 1952; Moldenke, Résumé 46, 48, & 447. 1959.

Shrub, 2.5--3 m. tall, or tree, to 7 m. tall; trunk to 10 cm. in diameter; branchlets and twigs slender, acutely tetragonal, light-brown, more or less ribbed, puberulent at the apex, becoming merely pulverulent or glabrate; nodes annulate; principal internodes 1.8--7.5 cm. long; leaf-scars borne on slender ascending or closely appressed sterigmata to 4 mm. long; leaves decussate-opposite or subopposite; petioles slender or stoutish, 6--12 mm. long, glabrate, deeply sulcate above; leaf-blades chartaceous, rather uniformly bright-green on both surfaces, oblong-elliptic or rarely subobovate, 7--13 cm. long, 2.8--5.8 cm. wide, acute or acuminate at the apex, entire, acute at the base, obscurely puberulent above, becoming subglabrate, densely

puberulent beneath, often distichously pubescent along the midrib, bearing 1 or 2 pairs of elongate brown glands at the base beneath parallel with the midrib; midrib slender, decidedly and sharply prominulent above, prominent beneath; secondaries slender, 5 or 6 pairs, ascending at an angle of about 45° , often not very arcuate, prominulent on both surfaces; vein and veinlet reticulation abundant, prominulent on both surfaces; racemes axillary and terminal, 3--14 cm. long, erect or nutant, simple or the terminal ones compound with 1--7 long branches, each simple raceme about 1.5 cm. wide in fruit, rather densely many-flowered; peduncles and rachis slender or stoutish, brownish, densely puberulent, the former 1--4 cm. long, often nodose; fruiting pedicels of 2 kinds, some very short and stout, about 1 mm. long, others among them very slender, elongate to 9 mm., and often genuiflexuous at the apex, puberulent, the latter type often not present; bracts foliaceous, similar to the leaves, but smaller; bractlets linear, 4--8 mm. long; prophylla linear, 2--4 mm. long; flowers not known; fruiting-calyx indurated, cupuliform, about 3.5 mm. long and 5 mm. wide, minutely puberulent or glabrate, usually borne on a corky receptacle, its rim broadly 5-lobed with triangular lobes or merely erose; fruit drupaceous, oblong, about 7 mm. long and 6 mm. wide, slightly fleshy, glabrous, rather shiny, bright-orange when fresh, wrinkled and brown or blackish and 2-sulcate in drying.

The type of this species was collected by George Proctor Cooper III and George Mackay Slater (no. 157) at Progreso, Chiriquí, Panama, in July or August, 1927, and is deposited in the Britton Herbarium at the New York Botanical Garden. It has hitherto been confused with the related C. cooperi Standl., from which it may at once be distinguished by its prominulous venation on the upper leaf-surface. Common names recorded for it are "corrimiente" and "corrimiento", the former also listed for C. cooperi. It has also been confused by herbarium workers with C. recurvatum Greenm. The species has been collected in fruit in January and August, and has been found at an altitude of 1300 meters. In all, 14 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: COSTA RICA: Cartago: J. León 1370 [Herb. Inst. Interamer. Turrialba 367; M.18] (W--2021436). Puntarenas: Brenes 12332 [211; 811] (F--856038). PANAMA: Chiriquí: Cooper & Slater 157 (A--isotype, B--photo of type, F--573060--isotype, G--isotype, K--photo of type, N--type, N--photo of type, S--photo of type, W--1318374--isotype, Y--10510--isotype, Z--photo of type), 201 (F--573120, N, W--1318410, Y--10554); Wagner 580 (Mu--755); Peggy White 223 (F--1005201).

CITHAREXYLUM WEBERBAUERI Hayek in Engl., Bot. Jahrb. 42: 169 (as "Citharexylon"). 1908; Prain, Ind. Kew. Suppl. 4: 49. 1913.

Literature: Hayek in Engl., Bot. Jahrb. 42: 169. 1908; Prain, Ind. Kew. Suppl. 4: 49. 1913; Moldenke, Geogr. Distrib. Avicenn.

23. 1939; Moldenke, Prelim. Alph. List Invalid Names 16. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 88. 1942; Moldenke, Alph. List Invalid Names 13. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 88. 1948; Moldenke, Alph. List Cit. 2: 328 (1948), 3: 691 (1949), and 4: 1112. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 72 & 180. 1949; Moldenke, Résumé 82, 255, & 447. 1959.

Shrub, about 1 m. tall; branches and branchlets strong and stiff, obtusely tetragonal or almost subterete, spinose, twiggy, glabrous or subglabrate; twigs greatly abbreviated, mostly covered by almost overlapping leaf-sterigmata, densely short-pubescent with dark-brownish hairs; spines to 16 mm. long, mostly simple, occasionally branched near the summit, sharp, stiff; nodes annulate, usually not clearly discernible except on young vigorous shoots; principal internodes on the branches and branchlets to 1.5 cm. long, on the twigs about 1 mm. long; leaves decussate-opposite, mostly crowded at the apex of the twigs; petioles very slender, 1--3 mm. long, densely short-pubescent; leaf-blades thin-chartaceous, dark-green, brunnescenscent or nigrescent in drying, oblong or oblong-elliptic to obovate, 7--17 mm. long, 3.5--10 mm. wide, rounded or obtuse at the apex, entire, acute and narrowed into the petiole at the base, apparently not glanduliferous, densely or sparsely puberulent or pilose above, becoming glabrescent, densely short-pubescent or velutinous with dark-brown hairs beneath; midrib very slender, obscure or subimpressed above, slightly prominulent beneath; secondaries several, mostly obscure; vein and veinlet reticulation mostly obscure; racemes abbreviated, to 1 cm. long, axillary and terminal, 3--6-flowered, subnulant; peduncle and rachis very slender, much abbreviated, densely short-pubescent or velutinous, the former 1--3 mm. long; pedicels very slender, 1--3 mm. long, densely short-pubescent; bracts and bractlets absent; prophylla absent or very minute; calyx campanulate, 4--5 mm. long, subvelutinous, its rim subtruncate, shortly 4-dentate; corolla yellowish-white, slightly surpassing the calyx, puberulent inside; fruiting-calyx and fruit not known.

The type of this species was collected by August Weberbauer (no. 3731) -- in whose honor it is named -- in the valley of the Río Marañon between Chuquibamba and Punchau, at an altitude of 2750 meters, Huamelies, Huanuco, Peru, on October 23, 1903, and is deposited in the herbarium of the Botanisches Museum at Berlin. The type locality is described as an open region covered with a mixed growth of shrubs, herbs, and grasses. The species is obviously related to *C. flexuosum* (Ruiz & Pav.) D. Don, but is said to differ from it by its rounded leaves, fewer-flowered racemes, and smaller flowers. In all, only 2 specimens and 7 mounted photographs have been examined.

Citations: PERU: Huanuco: Weberbauer 3731 [Macbride photos 17603] (B--type, F--663032--photo of type, K--photo of type, Kr--photo of type, N--isotype, N--photo of type, N--photo of type, S--photo of type, Z--photo of type). MOUNTED CLIPPINGS:

Engl., Bot. Jahrb. 42: 169. 1908 (B).

ADDITIONAL NOTES ON THE GENUS CITHAREXYLUM. I

Harold N. Moldenke

The following notes are supplementary to those published by me in my work entitled "Materials toward a monograph of the genus Citharexylum" in Phytologia 6: 242--256, 262--320, 332--368, & 383--432 (1958), 6: 448--505 (1959), and 7: 7--48 & 49--73. 1959.

CITHAREXYLUM B. Juss.

Additional synonymy: Citharaexylum Lavoie, in herb.

Additional literature: Veloso & Klein, Sellowia 8: 182 & 220. 1957; Biol. Abstr. 30: 3860 & 4395. 1958; Menninger, 1959 Price List [7]. 1958; Valdés Gutiérrez, Bol. Soc. Bot. Mex. 23: 114 & 129. 1958; Lombardo, Arb. Cult. Pas. Pub. 99--100 & 276. 1958; Moldenke, Résumé 12, 27, 34, 35, 40, 41, 43--51, 53--66, 70, 75, 76, 78, 79, 82, 87, 88, 113, 116, 118, 123, 129, 140, 165, 185, 203, 214, 215, 226, 234--237, 240, 252--259, 268, 276, 277, 282--284, 294, 297, 301, 302, 309, 313, 314, 319, 320, 330, 342, 343, 355, 391, 397, 398, 408, 415, 416, 418, 419, 422--424, 446, & 447. 1959; Moldenke, Résumé Suppl. 1: 2--5, 14, 16, 18, & 25. 1959.

CITHAREXYLUM AFFINE D. Don

Additional literature: Moldenke, Phytologia 6: 277--282. 1958; Moldenke, Résumé 34, 214, 255, 256, 258, 277, & 446. 1959.

Additional citations: MEXICO: México: G. L. Fisher s.n. [Ame-
cameca, July 24, 1924] (V1).

CITHAREXYLUM ANDINUM Moldenke

Additional literature: Moldenke, Phytologia 6: 262 & 288--289. 1958; Moldenke, Résumé 82, 113, & 446. 1959.

Additional citations: BOLIVIA: Cochabamba: Troll 978 (B).

CITHAREXYLUM BERLANDIERI B. L. Robinson

Additional literature: Moldenke, Phytologia 6: 265 & 290--294. 1958; Moldenke, Résumé 27, 34, 214, 253, 259, & 446. 1959.

The Pringle 3734 collection appears to be a topotype collection.

Additional citations: MEXICO: San Luis Potosí: Pringle 3734 (Mm--15343).

CITHAREXYLUM BRACHYANTHUM (A. Gray) A. Gray

Additional synonymy: Citharexylum brachyantum Gray ex Valdés

Gutiérrez, Bol. Soc. Bot. Mex. 23: 114. 1958.

Additional literature: Valdés Gutiérrez, Bol. Soc. Bot. Mex. 23: 114 & 129. 1958; Moldenke, Phytologia 6: 262 & 295—298. 1958; Moldenke, Résumé 27, 34, 253, 255, 319, & 446. 1959; Moldenke, Résumé Suppl. 1: 16. 1959.

Additional citations: MEXICO: San Luis Potosí: Pringle 3749 (Mm—15344).

CITHAREXYLUM CAUDATUM L.

Additional literature: Moldenke, Phytologia 6: 269 & 299—310. 1958; Moldenke, Résumé 34, 41, 43, 44, 46, 47, 49, 51, 53, 54, 56, 58, 61, 65, 82, 185, 214, 237, 252—256, 258, 277, 294, 301, & 446. 1959.

The species ascends to 5250 feet altitude in Jamaica according to Stearn. It has been misidentified as C. spinosum L. by Degener & Murashige.

Additional citations: CUBA: Havana: Marie-Victorin & Alain 22328 (Vi). Las Villas: Hodge & Howard 5228 (Um—48510). ISLA DE PINOS: Marie-Victorin & Alain 115 (Vi, Vi). JAMAICA: Stearn 93 (N, S); Yuncker 17467 (S). CULTIVATED: Hawaiian Islands: Degener & Murashige 20075 (B).

CITHAREXYLUM DECORUM Moldenke

Additional literature: Moldenke, Phytologia 6: 275 & 319—320. 1958; Moldenke, Résumé 70 & 446. 1959.

Tree to 20 meters tall, according to Bernardi, who found it along wooded roadsides at an altitude of 850 meters and misidentified it as a species of Guettarda in the Rubiaceae.

Additional citations: VENEZUELA: Mérida: Bernardi 6739 (N).

CITHAREXYLUM DONNELL-SMITHII Greasm.

Additional literature: Moldenke, Phytologia 6: 266, 270, & 336—340. 1958; Moldenke, Résumé 34, 41, 45, 46, 48, 214, 254—257, & 446. 1959; Moldenke, Résumé Suppl. 1: 3. 1959.

The species has been collected in fruit also in February. Standley & Padilla report it as "common" in Sonsonate.

Additional citations: EL SALVADOR: Sonsonate: P. H. Allen 7221 (N); Standley & Padilla V. 2664 (N).

CITHAREXYLUM FLABELLIFOLIUM S. Wats.

Additional literature: Moldenke, Phytologia 6: 265 & 347—349. 1958; B. H. Johnson, Wasmann Journ. Biol. 16: 295. 1958; Moldenke, Résumé 34, 40, 240, 256, & 446. 1959.

Johnson describes the plant as "a shrub, about 3 to 5 feet high, with short stiff branches, flowers in different shades of lavender and purple with yellow centers; in the dense growth of various shrubs and small trees on the top of the granite bluff overlooking La Paz Bay, about 15 miles west of La Paz," in Baja California.

CITHAREXYLUM FRUTICOSUM L.

Additional literature: Moldenke, *Phytologia* 6: 265, 269, & 354—366. 1958; *Biol. Abstr.* 30: 3860. 1958; Moldenke, *Résumé* 12, 49, 51, 54, 56—63, 70, 76, 214, 235, 252, 253, 255—259, 277, 415, 418, & 446. 1959.

According to entry 32312 in volume 30 of "Biological Abstracts" a new species of the fungus genus Irene has been discovered on this species in the Dominican Republic. Yuncker found C. fruticosum at 2500 feet altitude in Jamaica and reports the additional common name "yellow fiddlewood". Lanjouw & Lindeman found the plant along a roadside on a shell ridge and misidentified it as C. spinosum L.

Additional citations: FLORIDA: Dade Co.: Small & Small s.n. [November 26—December 20, 1913] (V1). CUBA: Havana: León 480 (V1). JAMAICA: Yuncker 17842 (S), 18054 (Bm, S). WINDWARD ISLANDS: St. Vincent: E. H. L. Krause 12 (B). TRINIDAD: W. E. Broadway s.n. [Aug. 28, 1932] (B). SURINAM: Lanjouw & Lindeman 1560 (N).

CITHAREXYLUM FRUTICOSUM var. VILLOSUM (Jacq.) O. E. Schulz

Additional literature: Moldenke, *Phytologia* 6: 265, 275, & 389—394. 1958; Moldenke, *Résumé* 12, 49, 51, 55, 56, 58—61, 214, 252—257, 259, 277, 391, 424, & 446. 1959; Moldenke, *Résumé* Suppl. 1: 2. 1959.

Additional citations: CUBA: Las Villas: R. A. Howard 4952 (Um—48213, Um—48556).

CITHAREXYLUM HIDALGENSE Moldenke

Additional literature: Moldenke, *Phytologia* 6: 275 & 406—408. 1958; Moldenke, *Résumé* 35 & 446. 1959; Moldenke, *Résumé* Suppl. 1: 3. 1959.

Additional citations: MEXICO: México: Schiede s.n. [prope S. José del Oro, 1831] (B).

CITHAREXYLUM ILICIFOLIUM H.B.K.

Additional literature: Moldenke, *Phytologia* 6: 264, 267, 271, & 411—415. 1958; Moldenke, *Résumé* 79, 82, 113, 214, 253, 277, 283, 416, & 446. 1959.

Additional citations: ECUADOR: Azuay: Giler 6 (N). Pichincha: Benoist 2378 (S); Herb. Humboldt s.n. [Chillo; Macbride photos 17593] (N—photo of cotype).

CITHAREXYLUM KUNTHIANUM Moldenke

Additional literature: Moldenke, *Phytologia* 6: 264, 273, & 426—429. 1958; Moldenke, *Résumé* 66, 70, 214, 254, 258, & 447. 1959.

Additional citations: COLOMBIA: Cauca: Sneidern 2816 (N). VENEZUELA: Trujillo: Collector undesignated 10769 (V1).

CITHAREXYLUM LONGIFLORUM Turcz.

Additional literature: Moldenke, *Phytologia* 6: 276 (1958) and 6: 453--454. 1959; Moldenke, *Résumé* 51, 252, & 447. 1959; Moldenke, *Résumé Suppl.* 1: 4, 16, & 25. 1959.

Examination of a phototype indicates that this plant is *Clerodendrum grandiflorum* (Hook.) Schau. Turczaninow's binomial must, therefore, be deleted from the list of valid species of *Citharexylum*.

CITHAREXYLUM MIRIFOLIUM Moldenke

Additional literature: Moldenke, *Phytologia* 6: 271 (1958) and 6: 467--468. 1959; Moldenke, *Résumé* 70 & 447. 1959; Moldenke, *Résumé Suppl.* 1: 5. 1959.

Additional citations: VENEZUELA: Trujillo: Aristeguieta & Medina 3690 (N).

CITHAREXYLUM MOCINNI D. Don

Additional literature: Moldenke, *Phytologia* 6: 274 (1958) and 6: 468--471. 1959; Moldenke, *Résumé* 35, 254, 257--259, & 447. 1959.

Additional citations: MEXICO: Vera Cruz: Schiede 84 [Macbride photos 17599] (N--photo).

CITHAREXYLUM MONTEVIDENSE (Spreng.) Moldenke

Additional literature: Menninger, 1959 Price List [7]. 1958; Moldenke, *Phytologia* 6: 262 (1958) and 6: 474--479. 1959; Lombardo, *Arb. Cult. Pas. Pub.* 99--100. 1958; Moldenke, *Résumé* 87, 116, 118, 123, 214, 252--255, 276, 277, 284, 342, & 447. 1959.

Additional illustrations: Lombardo, *Arb. Cult. Pas. Pub.* 100. 1958.

Additional citations: BRAZIL: Rio Grande do Sul: Costa Sacco 462 [Herb. Hort. Bot. 1478] (N). PARAGUAY: Sparre & Vervoorst 1026 (Vi).

CITHAREXYLUM MYRIANTHUM Cham.

Additional literature: Veloso & Klein, *Sellowia* 8: 182 & 220. 1957; Moldenke, *Phytologia* 6: 277 (1958) and 6: 481--487. 1959; Moldenke, *Résumé* 88, 116, 123, 215, 252--254, 256--258, & 447. 1959.

Additional citations: BRAZIL: Santa Catarina: Klein 297 [Herb. Reitz 4641] (N), 866 [Herb. Reitz 10012] (N), 2195 [Herb. Reitz 14207] (N); Reitz & Klein 2697 [Herb. Reitz 10005] (N).

CITHAREXYLUM POEPPIGII Walp.

Additional literature: Moldenke, *Phytologia* 6: 263 & 277 (1958) and 6: 498--500. 1959; Moldenke, *Résumé* 66, 70, 79, 82, 88, 254, 256, & 447. 1959.

Additional citations: ECUADOR: Napo-Pastaza: Asplund 10227 (N).

CITHAREXYLUM PSILACANTHUM Turcz.

Additional literature: Moldenke, *Phytologia* 6: 262 (1958) and 6: 501--502. 1959; Moldenke, *Résumé* 226 & 447. 1959; Moldenke, *Résumé Suppl.* 1: 15, 16, & 25. 1959.

Examination of a phototype of this species indicates that the plant is Rhaphithammus spinosus (A. L. Juss.) Moldenke. The binomial of Turczaninow, therefore, must be deleted from the list of valid species in Citharexylum.

CITHAREXYLUM PTEROCLADUM Donn. Sm.

Additional literature: Moldenke, *Phytologia* 6: 267 (1958) and 6: 502--504. 1959; Moldenke, *Résumé* 35, 41, 43, 257, & 447. 1959.

Additional citations: MEXICO: Michoacán: Hinton 15852 (N).

CITHAREXYLUM SPINOSUM L.

Additional literature: Moldenke, *Phytologia* 6: 266, 268--270, & 272 (1958) and 7: 33--46. 1959; Moldenke, *Résumé* 49, 51, 55, 56, 58--64, 70, 76, 78, 129, 140, 165, 203, 215, 252--259, 277, & 447. 1959; Moldenke, *Résumé Suppl.* 1: 16 & 18. 1959.

Additional synonymy: Citharaexylum quadrangulare Jacq., in herb.

The Krause specimen cited below exhibits some insect galling of the flowers very similar to that seen in species of Duranta.

Mr. N. Y. Sandwith and M. J. Vidal have recently informed me that the genus Hadongia Gagnep. is a synonym of Citharexylum, and that H. eberhardtii Gagnep. is probably conspecific with C. spinosum. I am awaiting receipt of the type specimen to check this assertion.

Additional citations: WINDWARD ISLANDS: St. Vincent: E. H. L. Krause 16836 (B). TRINIDAD: Cowan & Forster 1278 (Z).

NOTES ON NEW AND NOTEWORTHY PLANTS. XXIV

Harold N. Moldenke

CALLICARPA LONGIFOLIA var. HORSFIELDII (Turcz.) Moldenke, comb. nov.

Callicarpa horsfieldii Turcz., *Bull. Soc. Nat. Mosc.* 36 (2): 217. 1863.

CARYOPTERIS NEPALENSIS Moldenke, sp. nov.

Frutex; ramis ramulisque acute tetragonis minutissime puberulis; foliis decussatis; petiolis brevibus pubescentibus; laminis ovatis longe acuminatis regulariter serratis, ad basin rotundatis vel truncatis vel subcordatis, utrinque parvisissime minutissimeque puberulis, supra subscabridis; inflorescentiis axil-

laribus terminalibusque divaricatis laxissime cymosis thyrsoidesque ubique dense cano-puberulis; corollis roseis.

Loosely growing shrub, to 4 m. tall; branches and branchlets apparently wide-spreading, slender, acutely tetragonal, sparsely and minutely puberulent; nodes annulate; principal internodes 4–10 cm. long; leaves decussate-opposite; petioles short, 3–14 mm. long, rather densely short-pubescent or puberulent; leaf-blades rather uniformly green on both surfaces or somewhat lighter beneath, beautifully ovate, 4–15 cm. long, 2.8–10.5 cm. wide, rather long-acuminate at the apex, uniformly serrate along the margins except on the acumination and base, varying from rounded to truncate or subcordate at the base, very sparsely and minutely puberulent on both surfaces, slightly scabridous above, those in the terminal inflorescence smallest; midrib slender, flat above, prominent beneath; secondaries 4–6 per side, beautifully arcuate-ascending, flat above, prominent beneath, not plainly anastomosing; tertiaries numerous, subparallel, uniting the secondaries with the midrib and issuing at approximately right angles to them, rather obscure above, subprominulous beneath; inflorescence massive, terminal and thyrsoid, also loosely cymose in the uppermost axils, the axillary cymes long-pedunculate, divaricate, very loosely wide-spreading, rather many-flowered, to 12 cm. long and 9 cm. wide, simple or compound and foliose, the cyme-branches very slender, acutely tetragonal, densely cano-puberulent; peduncles slender, acutely tetragonal, 4–8 cm. long; terminal thyrse massive, often to 50 cm. long and 25 cm. wide, very loosely many-flowered, often foliose, the rachis, sympodia, and cyme-branches sharply tetragonal, more or less densely white-puberulent; bractlets numerous, broadly linear or very narrowly elliptic, 2–7 mm. long, to 1 mm. wide, densely puberulent, a pair at every node of the inflorescence to the ultimate flowers, conspicuous on the cyme-branches; pedicels slender, 1–3 mm. long, densely white-puberulent; calyx campanulate, about 3 mm. long and wide, densely white-puberulent, the rim 5-toothed or 5-lobed, the teeth spreading, ovate, 1–1.5 mm. long, acute; corolla zygomorphic, pink, its tube about 10 mm. long, slender, white-puberulent outside, the limb about 15 mm. wide, white-puberulent beneath; stamens long-exserted, the filaments and anthers pink; fruiting-calyx herbaceous, campanulate, rather closely appressed to the fruit, to 5 mm. long and wide, rather densely whitish-puberulent with antrorsely appressed hairs, the rim very plainly 5-lobed with broadly ovate and subacuminate lobes or teeth; fruit capsular, subglobose, 4–5 mm. long and wide, minutely puberulent, conspicuously venose.

The type of this very distinctive species was collected by O. Polunin, W. R. Sykes, and L. H. J. Williams (no. 537) amid scrub thickets at the edge of cultivation at Jajakot, Pokhara, Nepal, at an altitude of 3500 feet, on August 21, 1952, and is deposited in the herbarium of the British Museum (Natural History) in London. It is obviously related to the Chinese C. divaricata (Sieb. & Zucc.) Maxim.

CLERODENDRUM DISCOLOR var. **VERBASCIFOLIUM** Moldenke, var. nov.

Haec varietas a forma typica *speviei* recedit foliis maximis utrinque densissime longeque pubescentibus.

This variety differs from the typical form of the species in its very large leaves, which are to 17.5 cm. long and 10 cm. wide and very densely long-pubescent on both surfaces.

The type of the variety was collected by A. Peter (no. 32288) between Mission Schlesien and Lugongo, in the Uluguru Mountains above Morogoro, Tanganyika, on November 19, 1925, and is deposited in the herbarium of the Botanisches Museum at Berlin. It was annotated as "*Clerodendron verbascifolium* n. spec." by "E. W[all?]" and as "*Clerodendrum* (*Cyclonema*) sp." by J. B. Gillett at Kew, where, he says, it cannot be matched.

CLERODENDRUM SERRATUM var. **NEPALENSE** Moldenke, var. nov.

Haec varietas a forma typica speciei recedit laminis foliorum oblongis vel suboblongo-ellipticis.

This variety differs from the typical form of the species in having its leaf-blades distinctly oblong or slightly oblong-elliptic, 5.5–10.5 cm. long, 1.5–2.5 cm. wide, varying from irregularly appressed-serrate with small and scattered teeth or subentire to coarsely toothed.

The type of the variety was collected by O. Polunin, W. R. Sykes, and L. H. J. Williams (no. 3965) on steep dry grassy slopes in open coniferous forest at Badalkdt, Karnali Valley, altitude 4500 feet, Nepal, on April 24, 1952, and is deposited in the herbarium of the British Museum (Natural History) in London. The collectors note that the upper part of the stem and the bracts are purple with white tomentum, the corolla lobes are very pale mauve, with the anterior lobe darker, the filaments pale mauve, the anthers brown, the pollen white, and the stigma male mauve. The plant was just coming into flower when collected.

CLERODENDRUM SMITINANDI Moldenke, sp. nov.

Frutex arborescens; ramulis minute puberulis glabrescentibus; petiolis brevibus glabris; foliis laminarum tenuiter membranaceis ellipticis acuminatis integris utrinque glabris, ad basin cuneato-attenuatis; inflorescentiis axillaribus corymbosis.

Arborescent shrub; branchlets medium-slender, obtusely tetragonal, minutely puberulent when young, glabrescent in age; nodes not annulate; principal internodes 1.8–2.5 cm. long, mostly abbreviated; leaves decussate-opposite; petioles very slender, short, 6–12 mm. long, glabrous; leaf-blades thin-membranous, rather uniformly dark-green on both surfaces, elliptic, 8–15.5 cm. long, 3–5.2 cm. wide, acuminate at the apex, cuneate-attenuate at the base, entire, glabrous on both surfaces; midrib very slender, flat above, prominent beneath; secondaries very slender, about 6 pairs, arcuate-ascending, flat on both surfaces and rather indistinct; veinlet reticulation obscure; inflorescence axillary, corymbose, about 9 cm. long when in

fruit and about equally wide; flowers not known; fruiting peduncles 2.5--3 cm. long, stoutish, minutely puberulent, apparently leafy-bracteate at several nodes, bearing about 6 closely opposite or crowded branches at the apex, the branches erect or ascending, 4.5--5 cm. long, glabrescent, usually once or twice forked at the apex, with 1 or 2 scattered bractlets on each fork, the bractlets linear, 3--9 mm. long, scattered-puberulent or glabrescent; fruiting-calyx rather heavy, cupuliform, about 17 mm. long and wide; glabrate, deeply 5-lobed, the lobes ovate, about 1 cm. long, about 6 mm. wide at the base, long-attenuate to the acute apex, bright purplish-red when fresh; fruit drupaceous, fleshy, rotund, about 12 mm. long and wide, glabrous, shiny.

The type of this species was collected by my good friend and colleague, Ten Smitinand (no. 3197) by a stream in an evergreen jungle, at about 600 meters altitude, at Pratrang, Pong Namrawn, southeastern Chanturi, Thailand, on January 21, 1956, and is no. 14380 in the Royal Forest Department Herbarium, deposited in the H. N. Moldenke Herbarium at Yonkers, N. Y.

COELOCARPUM AFRICANUM Moldenke, sp. nov.

Frutex multibrachiatus aromaticus vel arbor humilis; ramulis glabrescentibus fragilibus; sarmentis plusminusve albido-pilosis glanduloso-punctatis; foliis numerosis confertis ovato-orbicularibus vel oblongis, ad apicem rotundatis vel subacutis, ad basin acutis usque ad rotundatis vel subtruncatis, crasse dentatis, supra scabris, subtus dense resinoso-punctatis; inflorescentiis terminalibus racemiformibus sparsis paucifloris rectis irregulariter albido-pilosis et resinoso-punctatis; pedunculo rhachideoque subfiliformibus.

Much-branched aromatic shrub or tree, mostly only 1 m. tall or less; branches and branchlets rather slender, gray, very brittle, glabrescent, the smaller ones obtusely tetragonal, the older ones subterete; twigs very slender, more or less sparsely whitish-pilose with scattered irregular erect hairs, more densely so when young, glandular-punctate; nodes not annulate; principal internodes abbreviated, 1--2.3 cm. long or less; leaves numerous, crowded, bright shiny green above, lighter beneath, thin-chartaceous, ovate-orbicular or oblong, 1--1.8 cm. long, 0.5--1.5 cm. wide, rounded or subacute at the apex, varying from acute to rounded or subtruncate at the base, coarsely dentate with 1 or 2 large rounded teeth on each margin, scabrous with short and stiff bulbous-based hairs above, less so and densely resinous-punctate beneath; petioles very slender and short, 1--3 mm. long, scattered or rather densely pilose and resinous-punctate; inflorescence terminal, racemiform, 1.5--2.5 cm. long, sparse, few-flowered, erect, irregularly whitish-pilose and resinous-punctate, the peduncle and rachis subfiliform; bractlets linear, spreading, about 2 mm. long, long-pilose, surpassing the pedicels; pedicels filiform, about 1 mm. long, densely whitish-pilose with erect antrorse hairs; calyx narrow-campanulate, about 3 mm. long and 2 mm. wide, membranous, 5-costate and -angled,

slightly zygomorphic, white-pilose with antrorse hairs on the ribs, puberulent and resinous-punctate between the ribs, the rim 5-toothed with rounded and white-ciliolate non-apiculate teeth; corolla hypocrateriform, small, white, glabrous or subglabrous outside, the tube broadly cylindric, about 4 mm. long, the limb 5-lobed, the throat mauve and densely hairy, the lobes about 2 mm. long, broadly rounded; stamens and pistil included; fruiting-calyx cupuliform, not much accrescent, deeply split, pilosulous-puberulent and resinous-punctate; fruit drupaceous, subglobose, about 4 mm. long and wide, glabrate, deeply 4-lobed and -sulcate, apiculate at the apex with the persistent style-base.

The type of this distinct species was collected by P. R. O. Bally (no. 11144) on a rocky hillside facing east at Geldin, altitude 4300 feet, in the Al Madu Range, British Somaliland, at about 48°35' E. and 10°55' N., on October 15, 1956, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. This is the first species of the genus known from continental Africa. It has been found also by the same collector (no. 11236) on rocky slopes with *Euphorbia* sp. aff. *E. candelabrum* on the Mait Escarpment, altitude 5400 feet, where "it appears to be rare", on October 28, 1956; by Captain E. F. Peck (no. Y.119) at Dallo Erigavo on July 21, 1942; and by Glover & Gilliland (no. 742) on a rock slab at Daganyado in the mist belt of the Coastal Mountains on February 10, 1945.

DURANTA REPENS var. *SERRATA* Moldenke, var. nov.

Haec varietas a forma typica speciei foliis elliptico-lanceolatis regulariter grosseque serratis recedit.

This variety differs from the typical form of the species in having its leaves much larger, elliptic-lanceolate or oval in shape, and with the margins quite regularly serrate from near the apex to near the base.

The type of the variety was collected by Santiago Venturi (no. 9059) in the Parque Centenario, at an altitude of 450 meters, dept. Capital, Tucumán, Argentina, in May, 1929, and is deposited in the Britton Herbarium at the New York Botanical Garden. It is described as a shrub 2 m. tall, with rose flowers. Whether it was cultivated at the type locality is not known, but seems likely since the variety is otherwise known to me only from Cuba and Jamaica, where it is native.

GLOSSOCARYA PUBERULA Moldenke, sp. nov.

Frutex; ramis gracilibus tetragonis dense breviterque griseo-pubescentibus vel puberulis; foliis oppositis tenuiter chartaceis breviter ellipticis vel subrotundis, ad apicem rotundatis, ad basin cordatis, supra minutissime puberulis, subtus dense puberulis; inflorescentiis dense griseo-puberulis.

Woody and probably climbing shrub; branches slender, tetragonal, very densely short-pubescent or puberulent with sordid-gray hairs; nodes not plainly annulate; principal internodes

2--3.5 cm. long; leaf-scars comparatively large, elevated; leaves decussate-opposite; petioles slender, 5--10 mm. long, densely gray-puberulent; leaf-blades shortly elliptic or subrotund, thin-chartaceous, rather shiny above, 3.5--8 cm. long, 3.5--6 cm. wide, rounded at the apex, often with a very short tooth-like projection at the very tip, entire, conspicuously cordate at the base, very minutely puberulent above, especially along the midrib, or glabrescent, densely gray-puberulent throughout beneath; midrib slender, flat above, prominent beneath; secondaries very slender, 3--6 per side, irregular, not in opposite pairs, arcuate-ascending, flat or obscure above, prominulous beneath; veinlet reticulation very slender, abundant, rather conspicuous but not prominent above, slightly prominulous beneath; inflorescence terminal on short axillary twigs near the apex of the branches and forming a terminal panicle about 10 cm. long and wide, densely gray-puberulent throughout, the branches about 3 pairs, decussate-opposite; peduncle slender, tetragonal, 2--2.5 cm. long, densely gray-puberulent; sympodia resembling the peduncle in all respects; foliaceous bracts present at the nodes of the sympodia and beneath the individual cymes, resembling the leaves in form but rounded at the apex and somewhat less densely puberulent, submembranous; bractlets linear-oblong, 1--2 mm. long, acute, densely puberulent on both surfaces; pedicels very slender, 1 mm. long or less, densely gray-puberulent; calyx cyathiform, about 2 mm. long and 1 mm. wide, densely appressed strigose-puberulent with sordid gray hairs, the rim 5-toothed.

The type of this species was collected by Jean Baptiste Louis Pierre (no. 1208) at Pinlyšáp, Cambodia, in June, 1870, and is deposited in the Krukoff Herbarium at the New York Botanical Garden.

STACHYTARPHETA RESTINGENSIS Moldenke, sp. nov.

Fruticulus; caulibus ramisque crassis acute tetragonis glabris marginatis; foliis sessilibus vel subsessilibus subcoriaceis ellipticis vel suboblanceolatis obtusis vel subacutis utrinque glabris serratis; inflorescentiis spicatis; pedunculis brevibus tetragonis marginatis glabris; rhachide crasso glabro profunde excavato; bracteolis lanceolatis longe attenuatis glabris.

Shrubby and rather woody; stems and branches stout, acutely tetragonal, glabrous, the angles margined; nodes not annulate; principal internodes 3--4 cm. long; leaves decussate-opposite, sometimes with several small ones in their axils, sessile or subsessile, subcoriaceous, grayish-green, somewhat lighter beneath, elliptic or somewhat oblanceolate, 3.5--6 cm. long, 1.3--2.5 cm. wide, obtuse or subacute at the apex, rather regularly serrate with rounded teeth from the widest point to the apex, glabrous on both surfaces; midrib slender, flat above, slightly prominulent beneath; secondaries slender, 3 or 4 per side, ascending, slightly arcuate, flat on both surfaces or slightly prominulent beneath; veinlet reticulation rather sparse, flat on both surfaces, visible only on young leaves; inflorescence terminal,

spicate, to 30 cm. long; peduncle short, usually about 1 cm. long, tetragonal, margined, glabrous; rachis stout, glabrous, deeply excavated; bractlets lanceolate, about 5 mm. long, long-attenuate to the apex, glabrous, without scarious margins; calyx tubular, about 7 mm. long, glabrous; corolla and fruit not known.

The type of this species was collected by F. Segadas-Vianna, L. Dam, W. T. Ormond, G. C. Machline, and J. Lorêdo, Jr. (no. I-975) "no interior de brejo arborescente" near Barra de São João village, district of Barra de São João, Casimiro de Abreu Co., Rio de Janeiro, Brazil, on September 6, 1953, and is deposited in the herbarium of the Museu Nacional at Rio de Janeiro. Except for the texture of its leaves, it strongly resembles the West Indian S. jamaicensis (L.) Vahl.

PREMNA TANGANYIKENSIS Moldenke, sp. nov.

Frutex scandens; ramis ramulisque juventute dense fulvo-tomentellis, senectute glabrescentibus; sarmentis numerosis brevibus divergentibus obtuse tetragonis dense fulvo-tomentellis saepe minute aculeolatis; petioles brevibus debilibus dense fulvo-tomentellis; foliis membranaceis ellipticis argute acutis plusminusve serratis utrinque sparsiuscule breviterque tomentellis dein glabrescentibus, subtus plusminusve resinoso-glandulosis; inflorescentiis terminalibus axillaribusque subspicato-racemiformibus dense multo-floris simplicibus vel 1--2-brachiatis; pedunculo rhachideque dense fulvo-tomentellis; calyce elongato-tubuloso 4-plicato-costato dense fulvo-tomentello, margine 4-dentato, dentibus apiculatis; corollis flavis vel flavido-brunneis.

Scandent shrub or bush, 2--5 m. tall; branches and branchlets slender, obtusely tetragonal or subterete, densely fulvous-tomentellous when young, glabrescent in age; twigs numerous, short, divergent, obtusely tetragonal, densely fulvous-tomentellous, often minutely aculeolate, leafy; nodes not annulate; principal internodes 3--6 cm. long; leaves decussate-opposite, numerous; petioles slender, weak, 5--10 mm. long, densely fulvous-tomentellous; leaf-blades membranous, dark-green above, lighter beneath, elliptic, 4--10 cm. long, 2--4 cm. wide, sharply acute at the apex, more or less serrate from the middle or below the middle to the apex, abruptly acute at the base, rather sparsely short-tomentellous on both surfaces when young, usually glabrescent in age, more or less resinous-glandular beneath; midrib very slender, plane above, prominulent beneath; secondaries very slender, few, 3--5 per side, distant, ascending, not much arcuate, joined in loops near or at the apex beneath, mostly obscure above; inflorescence terminal and axillary, subspicate-racemiform, to 8 cm. long, about 1.5 cm. wide, densely many-flowered, simple or with 1 or 2 short branches at the base, borne at the ends of the branchlets and spur-like twigs, sometimes abbreviated and congested; peduncles slender, 1--1.3 cm. long, resembling and continuous with the twigs, densely fulvous-tomentellous; rachis resembling the peduncle in all respects; bractlets numerous,

linear, 2--3 mm. long, blunt, densely fulvous-tomentellous; pedicels very short or obsolete; calyx elongate-tubular, about 4 mm. long and 2 mm. wide, 4-plicate-costate, densely fulvous-tomentellous, the rim 4-apiculate-toothed; corolla yellow or yellowish-brown.

The type of this species was collected by H. Gillman (no. 1328) in Makonde thicket on orange sands, at Kitangari, Newala District, at about 39°20' E. and 10°40' S., in southeastern Tanganyika, on March 23, 1943, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. It was collected at about 1500 ft. alt.

PYGMAEOPREMNA HERBACEA var. *THAILANDICA* Moldenke, var. nov.

Haec varietas a forma typica speciei foliis anguste ellipticis vel oblanceolatis, margine irregulariter serratis vel subintegris recedit.

This variety differs from the typical form of the species in having its leaf-blades narrowly elliptic or oblanceolate, to 9.5 cm. long and 3--3.5 cm. wide, irregularly serrate with apiculate teeth or subentire with tiny apiculations in place of the teeth.

The type of the variety was collected by Tem Smitinand (no. 482) among grasses in an open pine forest, at an altitude of 800 meters, at Phetchabun, Lomkao, Namnao, in northern Thailand, on May 21, 1951, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. The type specimen consists of two plants, whose leaves are very different in appearance as to their margin. If they should prove distinct the varietal name here proposed is designated to apply to the subentire-margined specimen.

VERBENA MINUTIFLORA Briq., sp. nov.

Herba; caulibus ramisque sarmentisque rigidis argutissime tetragonis glabris brunnescentibus; nodis contractis; foliis decussatis firme chartaceis uniforme viridibus divaricatis vel adscendentibus anguste ellipticis sessilibus acutis trinerviis parce strigillosis; spicis terminalibus solitariis vel ternis abbreviatis multifloris; calyce dense albo-strigoso.

Herb; stems erect, stiff, very sharply tetragonal, glabrous or practically so, concave between the margins in drying; branches and twigs numerous, stiffly ascending, medium-stoutish, very sharply tetragonal, concave between the angles in drying, glabrous or practically so, brunnescent in drying, somewhat contracted at the nodes; nodes annulate; principal internodes 3--8.5 cm. long; leaves decussate-opposite, firmly chartaceous, uniformly green on both surfaces, divaricate or ascending, narrowly elliptic, 1.1--3.3 cm. long, 3--6 mm. wide, acute at the apex, somewhat narrowed to the sessile base, finely strigillose above and on the venation beneath, 3-veined; midrib and the two secondaries very slender, impressed above, slightly prominent below, the secondaries subparallel to the midrib from above the base almost to the apex, not anastomosing; inflorescence terminating the branches and twigs, subpaniculate; individual spikes

usually in 3's, sometimes solitary or paired, abbreviated, less than 1.5 cm. long, less than 1 cm. wide, many-flowered, pedunculate; peduncles very slender, slightly gray-strigillose, especially toward the apex, angulate, sulcate in drying; bracts paired under the branches of the inflorescence, resembling the leaves in all respects but smaller; bractlets linear-subulate or lanceolate, one pair subtending the group of 3 spikes and one subtending each flower in the spike, the latter 1.5--2 mm. long, acute at the apex, very minutely and obscurely grayish-strigillose, closely appressed to the calyx; calyx tubular, 2.5--3 mm. long, 1 mm. wide, densely and very conspicuously white-strigose, the teeth somewhat unequal; corolla hypocrateriform, lilac, its tube very slender, about 4 mm. long, glabrous, its limb about 2 mm. wide, strigillose beneath, glabrous above.

The type of this interesting species was collected by Captain P. King, R. N. (no. 78) at Montevideo, Uruguay, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques in Geneva. The type specimen was annotated as "V. minutiflora Briq." by Briquet before his death and was photographed by Macbride as Type Photograph 24693, but a valid description of the plant does not appear to have been published before this. The species is related to V. montevidensis Spreng., but is easily distinguished in any series of specimens.

VERBENA PARVULA var. GIGAS Moldenke, var. nov.

Haec varietas a forma typica speciei recedit caulibus erectis usque ad 90 cm. altis et foliis magnis usque ad 7.5 cm. longis et 2.5 cm. latis.

This variety differs from the typical form of the species in having its stems erect, to 90 cm. tall, the internodes greatly elongated, and the leaves elliptic-oblongate, to 7.5 cm. long and 2.5 cm. wide.

The type of the variety was collected by Ellsworth Paine Killip and Albert Charles Smith (no. 21925) on an open hillside at an altitude of 3000 to 3200 meters, at Tarma, Junín, Peru, between April 20 and 22, 1929, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collectors describe the corollas as pinkish-white. The plant has much the aspect of V. litoralis, but the inflorescence characters are those of V. parvula Hayek.

xVERBENA SOLBRIGII Moldenke, nom. nov.

Glandularia laciniata x peruviana Schnack & Solbrig, *Revist. Fac. Agron. La Plata* 29: 255--266, figs. 1--4. 1953.

VITEX SCHLIEBENI Moldenke, sp. nov.

Arbor; ramulis graciussculis tetragonis griseis juventute dense patenteque pubescentibus, pilis brunneis, senectute glabrescentibus; foliis 5-foliolatis; petiolis densiuscule patenteque brunneo-pubescentibus; laminis tenuiter chartaceis ellipticis

longe acuminatis integris, ad basin acutis vel attenuato-acuminatis, supra glabris subscabrellis, subtus dense brunneo-puberulis; inflorescentiis axillaribus paniculatis adscendentibus vel erectis multifloris.

Tree, 8—10 m. tall; branchlets rather slender, tetragonal, gray, densely spreading-pubescent on the younger parts, glabrescent in age, the hairs brownish; nodes not annulate; principal internodes 1.3—3 cm. long; leaves decussate-opposite, 5-foliolate; petioles slender, 7—9 cm. long, rather densely spreading-pubescent with brownish hairs; leaflets thin-chartaceous, elliptic, dark-green on both surfaces, shiny above, unequal, the central one 14—17 cm. long, 4—6 cm. wide, long-acuminate at the apex, entire, acute or attenuate-acuminate at the base, on a petiolule 12—23 mm. long, the lateral ones smaller, the basal ones smallest, 5—6 cm. long, 2.5—3.5 cm. wide, very short-petiolulate or sessile, all glabrous and subscabrellous above (except for the midrib) and densely puberulent with brownish hairs beneath, the hairs longer on the midrib and secondaries; midrib plane and puberulous above, prominent beneath; secondaries slender, 7—9 per side, ascending, arcuately joined near the margins, plane or subimpressed above, prominent beneath; veinlet reticulation very abundant, plane or subimpressed above, prominent beneath, the tertiaries distinct, issuing at about right angles and joining the secondaries, subparallel; inflorescence axillary near the apex of the branchlets, paniculate, the panicles ascending or erect, 4—5 cm. long, about 2 cm. wide, many-flowered; peduncles very slender, 1 cm. long or less, densely brownish-puberulent; rachis very slender, densely puberulent; pedicels elongate, filiform, 2—4 mm. long, densely brownish-puberulent; calyx campanulate, about 2 mm. long and wide, densely brownish-puberulent, the rim shallowly dentate; corolla hypocrateriform, white, the tube about 4 mm. long; stamens exserted.

The type of this species was collected by H. J. Schlieben (no. 6008) — in whose honor it is named — at Mbamba, at an altitude of 200 meters, Kimuera, 100 km. west of Lindi, Tanganyika, on February 17, 1935, and is deposited in the herbarium of the Botanisches Museum at Berlin. It was compared by J. B. Gillett at Kew, and he reports that it matches nothing there. It appears to be related to *V. volkensii* Gürke, but may be distinguished at once by the long pedicels.

ERIOCAULON LONGIFOLIUM f. *VIVIPARUM* Moldenke, f. nov.

Haec forma a forma typica speciei capitulis maturis viviparis recedit.

This form differs from the typical form of the species in having its mature heads decidedly viviparous.

The type of the form was collected by Mondii (no. 278) at Tontianak, Borneo, on April 7, 1931, and is deposited in the herbarium of the Botanisches Museum en Herbarium at Utrecht. Viviparous forms are known in several species in this family.

TONINA FLUVIATILIS f. OBTUSIFOLIA Moldenke, f. nov.

Haec forma a forma typica speciei foliis brevibus latis at apicem obtusis recedit.

This form differs from the typical form of the species in having its leaves short and broad, 10—12 mm. long, to 4 mm. wide when mature, and blunt or obtuse at the apex.

The type of the form was collected by Noel Yvri Sandwith (no. 1042), who reports the plant as lying flat among *Sagittaria*, etc. on the muddy shore of the river at Mazaruni Station, British Guiana, on August 12, 1937, and is deposited in the herbarium of the Botanisch Museum en Herbarium at Utrecht.

ERIOCAULON SMITINANDI Moldenke, sp. nov.

Herba acaulescens; foliis rosulatis anguste oblongis tenuibus argute acutis glabris; vaginis glabris; pedunculis numerosis pallide stramineis ubique dense longeque pilosis; capitulis globosis griseis.

Acaulescent herb; leaves rosulate, narrow-oblong, grass-like, thin-textured, uniformly bright-green on both surfaces, 3—4 cm. long, 1.5—2 mm. wide at the mid-point, sharply acute at the apex, glabrous, 4- or 5-ribbed, not noticeably pellucid-fenestrate; sheaths slender, closely appressed to the peduncles, 3—3.5 cm. long, many-striate, glabrous, obliquely split at the apex, the blade erect, lanceolate, closely appressed to the peduncle; peduncles numerous, erect, about 15 per plant, pale-stramineous, 8—15 cm. long, densely long-pilose throughout with irregularly spreading whitish hairs; heads globose, about 5 mm. long and wide, gray; involucre bractlets lanceolate, about 3.3 mm. long and 1 mm. wide, acute at the apex, long-pilose; receptacle densely long-pilose; receptacular bractlets obovate, about 1.8 mm. long and 0.3 mm. wide, densely long-pilose with antrorse hairs; staminate florets: sepals 3, separate, whitish, obovate, about 1.3 mm. long and 0.3 mm. wide, obtuse at the apex and short-barbellate there, otherwise glabrous; petals 3, united into a slender tube about 1 mm. long, the free lobes about 0.3 mm. long; stamens 3; anthers dark-brown; pistillate florets: sepals 3, separate, white, oblong, about 1.8 mm. long and 0.3 mm. wide, densely long-pilose on the back with antrorse hairs; petals 3, separate, whitish, linear-spatulate, about 1.5 mm. long and 0.2 mm. wide; style about 0.2 mm. long, stramineous, glabrous; stigma-branches about 0.8 mm. long; ovary globose, stramineous, about 0.3 mm. long and wide, 3-celled, 3-sulcate.

The type of this species was collected by my good friend and colleague, Tem Smitinand (no. 3679) — in whose honor it is named — who says that the species is very common in wet localities on the savannah at Chanburi, at an altitude of about 100 meters, on the trail between Makham and Khao Klu'a in south-eastern Thailand, collected on November 29, 1956, and deposited in the H. N. Moldenke Herbarium at Yonkers, New York. It is a pleasure to dedicate this species to a man who is doing such splendid work to increase of knowledge of the flora of Thailand.

ERIOCAULON THAILANDICUM Moldenke, sp. nov.

Herba acaulescens; foliis rosulatis anguste oblongis tenuibus 6-nerviis indistincte fenestratis glabris, ad apicem subulatis; vaginis laxis multistriatis glabris usque ad apicem ampliatis, limbo ovato longe acuminato vel subulato; pedunculis erectis tenuibus aureo-stramineis 3-costatis tortis glabris; capitulis griseis subglobosis.

Acaulescent herb; leaves rosulate, narrow-oblong, grass-like, thin-textured, bright-green above, somewhat lighter beneath, 1.5--2.5 cm. long, about 2 mm. wide at the mid-point, subulate-tipped at the apex, about 6-ribbed, rather indistinctly fenestrated, glabrous; sheaths rather loose, 2--2.5 cm. long, many-striate, glabrous, usually ampliate toward the apex, obliquely split at the apex, the limb ovate, erect or somewhat reflexed, long-acuminate or subulate-tipped; peduncles erect, slender, golden-stramineous, 12--13 cm. long, 3-costate, twisted, glabrous; heads subglobose, 5--7 mm. long and wide, gray; involucre bractlets stramineous, oblanceolate, about 3.3 mm. long and 1.6 mm. wide, long-acuminate or subulate-tipped at the apex; receptacle long-pilose; receptacular bractlets spatulate, whitish, about 2.3 mm. long and 0.6 mm. wide, long-caudate at the apex, long-pilose at the base, otherwise glabrous; staminate florets: sepals 3, separate, obovate, about 1.3 mm. long and 0.6 mm. wide, sparsely short-barbellate at the blunt apex, long-pilose at the base; petals 3, united into a slender tube about 1 mm. long; stamens 3; anthers brown; pistillate florets: sepals 3, separate, whitish, oblanceolate, about 2 mm. long and 0.5 mm. wide, acute at the apex, long-pilose on the back; petals 3, separate, oblong, about 1.6 mm. long and 0.3 mm. wide, acute at the apex, long-pilose on the back; pistil about 1 mm. long, glabrous; ovary subglobose, 3-celled, 3-sulcate.

The type of this species was collected by Bunnak Sangkhachand (no. 571a), common in a savannah at Chanturi, at an altitude of about 200 meters, Pong Namrarn, Ban Taru'ang, in south-eastern Thailand, on December 5, 1956, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. The collector records the vernacular name "chuk nok yung".

PAEPALANTHUS DENNISI Moldenke, sp. nov.

Herba acaulescens parvissimis; foliis caespitosis recurvatis ad apicem subulatis, ad basin ampliata in pilis densissimis longis albidis occultis; pedunculo solitario glabro 4-costato recto plerumque in pilis occulto; capitulis hemisphaericis albedo-nigris.

Acaulescent herb, very diminutive in size; leaves caespitose, recurved, rather thick-textured, shiny-green on both surfaces, 1--1.5 cm. long, about 1 mm. wide at the mid-point, subulate-tipped at the apex, the greatly ampliate base hidden in a very dense mass of long white cottony hairs; peduncle solitary, mostly hidden in the cottony hairs, 5--7 mm. long, glabrous, 4-costate, not twisted; heads hemispheric, about 6 mm. wide,

whitish when viewed from above, blackish when viewed from the side; involucre bractlets dark-brown or blackish, ovate, about 2 mm. long and 1.6 mm. wide, blunt and white-barbellate at the apex; receptacle densely long-pilose; receptacular bractlets obovate-spatulate, about 2 mm. long and 0.6 mm. wide, dark-brown and densely white-barbellate at the apex; staminate florets: sepals 3, separate, dark-brown, broadly oblong, about 1 mm. long and 0.5 mm. wide, densely white-barbellate at the apex; petals 3, united into a white glabrous infundibular tube about 1.3 mm. long, the free lobes very short; stamens 3; anthers light-brown; pistillate florets: sepals 3, separate, dark-brown, oblanceolate, about 1.3 mm. long and 0.6 mm. wide, densely white-barbellate at the rounded apex; petals 3, hyaline, separate, about 1 mm. long and 0.3 mm. wide, long-pilose toward the apex with antrorse hairs; pistil about 1 mm. long, glabrous; ovary globose, 3-celled, 3-sulcate.

The type of this amazing little species was collected by R. W. G. Dennis -- in whose honor it is named -- at Mucubaji, at an altitude of 3500 meters, in the Sierra de Santo Domingo, Mérida, Venezuela, on August 26, 1958, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

PAEPALANTHUS MEXIAE Moldenke, sp. nov.

Herba perennis; caulibus brevissimis densissime longo-pilosis, pilis brunneis; foliis graminoides subnumeris subchartaceis abrupte acutis multistriatis utrinque glabris nitidisque; vaginis arctissime adpressis dense pilosis; pedunculis gracilibus numerosis pallide brunneis dense piloso-pubescentibus; capitulis hemisphaericis atro-griseis.

Perennial herb; stems very short, very densely long-pilose with brown cottony hairs; leaves grass-like, erect or ascending, rather numerous, rather chartaceous in texture, 20--22 cm. long, 1--2 cm. wide, abruptly acute at the apex, many-ribbed, not fenestrate, glabrous and glistening-shiny on both surfaces; sheath so closely appressed to the peduncle as to be almost indiscernible, 6--7 cm. long, densely long-pilose with brownish hairs when young, less so in age; peduncles slender, numerous, 10--20 per plant, erect, light-brownish, 22--30 cm. long, densely pilose-pubescent with whitish hairs when young, more sparsely brownish-pilosulous in age; heads hemispheric, about 8 mm. wide, dark-gray; involucre bractlets dark-brown, ovate, about 2.2 mm. long and 1 mm. wide, acute at the apex, glabrous and shiny; receptacle long-pilose; receptacular bractlets brown, obovate, about 2.3 mm. long and 1.5 mm. wide, abruptly acute and ciliolate-barbellate at the apex, otherwise glabrous; staminate florets: sepals 3, separate, obovate, brown, about 2 mm. long and 1 mm. wide, short-barbellate at the apex, otherwise glabrous; petals 3, stramineous, united into a slender infundibular tube about 2 mm. long, glabrous, 3-lobed at the apex; stamens 3; anthers light-brown; pistillate florets: sepals 3, separate, brown, obovate, about 2.3 mm. long and 1 mm. wide, densely white-barbellate at the subtruncate apex; petals 3, separate, stramineous, obovate, about 2.3 mm.

long and 0.8 mm. wide, ciliolate toward and at the obtuse apex; style stout, about 0.2 mm. long, glabrous; stigmas 3, much surpassed by the 3 long-caudate style-branches which are 1.3—1.6 mm. long; ovary globose, brown, about 0.6 mm. long and wide, 3-celled and 3-sulcate.

The type of this species was collected by Ynes Enriquetta Julietta Reygades, née Mexia (no. 5833) — in whose honor it is named — in a damp clay bank, at an altitude of 1160 meters, at Ohristais, near Corrigo Dois Puntos, Distrito Diamantina, Minas Gerais, Brazil, on May 13, 1931, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collector affirms that the species is frequent at the type locality and has "whitish-gray" flowers. Standley misidentified the plant as *Eriocaulon kunthii* Körn., under which name it has been widely distributed.

PAEPALANTHUS SINGULARIUS Moldenke, sp. nov.

Herba pygmaea caulescens perennis; caulibus gracilibus valde furcatis densissime foliosis dense pilosis; foliis numerosissimis arctissime imbricatis lanceolatis crassis adscendentibus obtusis glabratissimis nitidis; pedunculis per ramulo solitariis filiformibus 2-costatis rectis glabris brunneis; vaginis brunneis ad apicem plusminusve pilosis; capitulis hemisphaericis brunneis.

Dwarf caulescent perennial herb; stems 1—2 cm. long, slender, abundantly branched, densely leafy, forming dense tufts or cushions, densely long-pilose; leaves very abundant, very closely imbricate, lanceolate, thick-textured, ascending, about 3 mm. long, blunt-tipped, glabrous and shiny or very obscurely pilosulous, the base hidden in the dense stem hairs; peduncles apparently one per branch, borne near its apex, about 2 cm. long, filiform, 2-costate, hardly twisted, glabrous, brown; sheath slender, about 4 mm. long, brown, not ribbed, oblique and more or less pilose at the apex, the limb somewhat recurved; heads hemispheric, about 2.1 mm. wide, brown; involucre bractlets light-brown, obovate, about 1 mm. long and 0.5 mm. wide, acute at the apex, glabrous; staminate florets: sepals 3, separate, brown, oblanceolate-spatulate, about 0.6 mm. long and 0.3 mm. wide, rounded at the apex; petals 3, brownish, united into a slender tube about 0.6 mm. long; stamens 3; anthers very small; pistillate florets: sepals 3, separate, stramineous, oblong, about 0.6 mm. long and 0.1 mm. wide, acute at the apex, pilose on the back at the apex; petals 3, separate, hyaline, very small.

The type of this curious dwarf species was collected by Adolfo Ducke (no. 9109) northeast of Taboleirinha, on the Rio Manuera, Pará, Brazil, on December 12, 1907, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

SYNGONANTHUS SICKII Moldenke, sp. nov.

Herba acaulescens annua; foliis linearibus rosulatis tenuibus glabris obtusis; pedunculis erectis filiformibus viridibus 2-cos-

tatis paullo tortis ubique densiuscule albido-pilosulis; vaginis arctissime appressis 5-striatis minute stellato-puberulis; capitulis albis; bracteolis interioribus magnis ampliatis albis.

Annual acaulescent herb; leaves linear, rosulate, thin-textured, 7—10 mm. long, about 0.5 mm. wide, several-striate, glabrous, shiny-green, blunt at the apex; peduncles about 6 per plant, erect, filiform, greenish, 2-costate, very slightly twisted, rather densely whitish-pilosulous throughout; sheaths very closely appressed to the peduncle, 1.7—2.5 cm. long, plainly 5-ribbed, glabrous on the ribs, often very obscurely and minutely stellate-puberulent with blackish hairs in some of the sulcations, obliquely split at the apex, the limb erect and closely appressed to the peduncle; heads white, about 7 mm. wide, Anthemis-like; outer involucre bractlets oblanceolate, pale-stramineous, about 0.8 mm. long and 0.3 mm. wide, rounded at the apex, glabrous; inner involucre bractlets much enlarged, shiny-white, obovate, concave on the upper surface, about 3 mm. long and 1.5 mm. wide, rounded at the apex, glabrous; staminate florets stalked: sepals 3, separate, white, about 1.2 mm. long and 0.3 mm. wide, obtuse at the apex, glabrous; petals 3, connate into a slender tube about 0.6 mm. long, glabrous; stamens 3; pistillate florets not seen.

The type of this species was collected by H. Sick (s.n.) in the Serra do Cachimbo of southern Pará, Brazil, in May, 1957, and is deposited as sheet no. 4703 in the G. F. J. Pabst Herbarium at Rio de Janeiro.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS PSEUDOCARPIDIUM. I

Harold N. Moldenke

This is the twenty-first in my series of monographic works on the genera of Verbenaceae. Previous genera so treated are Aegiphila Jacq., Amasonia L. f., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart. [Timotocia Moldenke], Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 249 herbaria whose material was examined in the preparation of this work will be found in Phytologia 5: 154—159 (1955) and 6: 242 (1958), with the following additions:

Bd = Herbarium Bradeanum, Rio de Janeiro, Brazil

Gl = Museu Goeldi, Belém, Pará, Brazil

Mm = McGill University, Montréal, Quebec, Canada

Ng = Department of Forests, Lae, New Guinea

Um = University of Montréal Herbarium, Montréal, Quebec, Canada

Wp = University of Manitoba, Winnipeg, Manitoba, Canada

PSEUDOCARPIDIUM Millsp., Field Mus. Publ. Bot. 2: 181. 1906.

Synonymy: *Pleurocarpidium* Millsp. ex Moldenke, Prelim. Alph.

List Invalid Names 36, in syn. 1940.

Literature: A. Rich. in Sagra, Hist. Fis. Cuba 11, Bot. 2: 148--149, pl. 64. 1850; Sagra, Fl. Cuba 4, Atlas Pl. Vasc., ed. 1, pl. 64 (1853), ed. 2, pl. 64. 1863; Griseb., Cat. Pl. Cub. 216--217. 1866; Nicholson, Illustr. Dict. Gard. 4: 186. 1884--1886; Jacks., Ind. Kew. 2: 1213--1214. 1895; Millsp., Field Columb. Mus. Publ. Bot. 2: 181--182. 1906; N. L. Britton, Bull. Torrey Bot. Club 39: 10. 1912; Prain, Ind. Kew. Suppl. 4: 192. 1913; Rehd. in L. H. Bailey, Stand. Cycl. Hort. 6: 3481. 1917; N. L. Britton, Mem. Torrey Bot. Club 16: 98. 1920; Britton & Millsp., Bahama Fl. 374. 1920; Prain, Ind. Kew. Suppl. 5: 209. 1921; Urb. in Fedde, Repert. 20: 346. 1924; Hill, Ind. Kew. Suppl. 6: 167. 1926; Urb. & Ekm., Arkiv Bot. 22A (10): 107. 1929; Hill, Ind. Kew. Suppl. 7: 252. 1929; Stapf, Ind. Lond. 6: 478. 1931; Hill, Ind. Kew. Suppl. 8: 249. 1933; Junell, Symb. Bot. Upsal. 4: 94 & 201. 1934; Moldenke, Revist. Sudam. Bot. 5: 2. 1937; Moldenke, Geogr. Distrib. Avicenn. 1, 5--7, & 39. 1939; Moldenke, Alph. List Common Names 8, 22, & 25. 1939; Moldenke, Suppl. List Common Names 24. 1940; Moldenke, Prelim. Alph. List Invalid Names 36 & 50--52. 1940; Carabia, Chron. Bot. 6: 227. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24--26, 74, & 99. 1942; Moldenke, Alph. List Invalid Names 36 & 52--56. 1942; Moldenke, Phytologia 2: 111. 1944; Moldenke, Alph. List Cit. 1: 55, 61, 63, 64, 74, 75, 109, 120, 184--189, 298, 309, 321, & 322. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 185. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 83. 1948; Moldenke, Alph. List Cit. 2: 543, 578, 646, 647, 650, & 651 (1948), 3: 664, 773, 868, 880, 895, 927--930, & 943 (1949), and 4: 986, 1127, 1137, 1143, & 1144. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 42, 44, 45, 48, 163, & 195. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 11. 1949; Roig, Dicc. Bot. 1: 301--302, 344--345, 427--428, & 695 and 2: 1087 & 1115. 1953; Moldenke, Phytologia 5: 151 & 152. 1955; Alain in León & Alain, Fl. Cuba 4: 280, 314--316, & 545, fig. 136. 1957; Moldenke, Résumé 50, 53, 54, 57, 222, 381, 383, 384, 386, 388, 389, 391, 409, & 468. 1959.

The original generic description is "Shrubs or low trees; leaves simple, opposite, entire or crenate-dentate; flowers paniculate; calyx campanulate, 5-dentate, equal; corolla tubular, 5-fid; stamens 4, didynamous, exserted; stigma bifid; drupe 2-pyrened; pyrenes osseous, 2-celled, 1-seeded, located in the center of the drupe. $\psi\epsilon\upsilon\delta\eta\varsigma$ false, $\kappa\alpha\rho\pi\iota\delta\iota\omicron\nu$ carpid, in reference to the four carpid-like prominences on the fruit — these apparent cocci are simply fleshy masses, Richard's fig. 3, pl. 64, to the contrary notwithstanding."

The members of this genus are shrubs or small and low straggling trees, 2--8.5 m. tall, often branched from the base; trunk to 45 cm. in diameter at the base; branches mostly woody, stiff, with slender circular pith; branchlets rather slender or medium-slender to medium-stout, usually twiggy, usually obscurely or very obtusely tetragonal when young and subterete in age, varying from buff or brownish to gray, light-gray, whitish, or even silvery, the younger parts usually finely or densely short-puberulent with brownish, flavescent, or sordid hairs, becoming glabrescent in age, often rather rigid; twigs similar to the branchlets in most respects, often very numerous, short, decussate-opposite, usually more conspicuously tetragonal, sometimes with the pubescence interspersed with tiny resinous globules; leaf-scars usually not prominent on older wood, sometimes somewhat prominent and corky on branchlets and twigs; nodes sometimes distinctly or obscurely annulate, at least on the younger wood, sometimes slightly swollen; principal internodes 0.2--4.3 cm. long or to 7.3 cm. long on vigorous shoots, sometimes greatly abbreviated on very short stunted or spur-like twigs or even almost obsolete; leaves decussate-opposite, apparently simple but probably actually 1-foliolate, often crowded on short twigs and absent from older wood, usually very leathery and stiff, often very revolute, sometimes like Ilex opaca Ait. in general form, frequently very variable even on the same branch; petioles slender or very slender, 1--9 mm. long, rather densely short-pubescent or tomentulose to puberulent or short-puberulent with canescent, flavescent, or brownish hairs, sometimes merely pulverulent, rarely glabrate, not articulate-jointed, often flattened and more or less canaliculate above, usually not at all or only very slightly ampliate at the base, the puberulence sometimes interspersed with tiny resinous globules; leaf-blades subcoriaceous or coriaceous, varying from dark- or bright-green to light- or gray-green above, sometimes darker but usually dull and very pale or even whitish beneath, often very irregular in size and shape on the same branch, varying from elliptic or narrowly elliptic to oblong or oblong-lanceolate, rarely oblanceolate, narrowly obovate, or even orbicular, often more or less asymmetric, 0.9--9.3 cm. long, 0.4--5 cm. wide, varying from rounded, obtuse, or bluntly subacute to acute, sharply acute, or acuminate and often spinulose at the apex, rarely emarginate, varying from acute, subacute, or cuneate to obtuse, broadly rounded, or even subcordate or cordate at the base, varying from entire or subentire and more or less revolute to irregularly spinulose-dentate with often large and coarse triangular teeth and elongated spines along the margins, often undate or sinuate, sometimes abundantly spinulose from base to apex or entire only near the base, rarely somewhat asymmetrically 1- or 2-lobed toward the apex, often densely puberulent or granular-pulverulent above when immature, glabrous and shiny above when mature, sometimes very shiny and glossy above at all times, varying from short-tomentulose or short-pubescent to puberulent or pulverulent beneath, with usually matted

canescent, cinereous, or sordid hairs, often also more or less granular-pulverulent on the midrib and larger venation, sometimes pustulate or silvery beneath, occasionally glabrate only on the lamina beneath, rarely very shiny and glossy throughout, sometimes the puberulence interspersed with tiny resinous globules, the very immature ones sometimes chartaceous and nigrescent in drying, the marginal spines often 1—1.5 mm. long; midrib slender, varying from flat to subimpressed or even deeply impressed above, usually very strong and prominent to the apex beneath; secondaries slender, 3—18 per side, short, often very irregular, sometimes close together, divergent from the midrib at almost right angles or more or less arcuate-ascending, often conspicuously anastomosing or arcuately joined near the margins beneath, varying from subimpressed to subprominent (sometimes in a slight channel) or obscure (sometimes indiscernible) above, usually very strong and conspicuously prominent or prominent beneath, sometimes slightly webbed at the base, rarely very obscure or even indiscernible on both surfaces, occasionally conspicuously anastomosing to form a rather uniform collective vein close to the margins beneath; vein and veinlet reticulation fine and abundant, varying from indiscernible or obscure to subprominent to the finest details above, all very prominent or only the larger portions prominent beneath, sometimes much darker than the cinereously pubescent lamina, rarely obscure or even indiscernible beneath; inflorescence axillary, paniculate, 2—16 cm. long, 1—6.5 cm. wide, solitary or paired, usually composed of 1—7 pairs of often irregularly disposed and lax rather few-flowered or uniformly 3-flowered cymules and a terminal one, the larger ones often bracteate, sometimes very slender and tenuous throughout; peduncles very slender or filiform, 0.5—6.1 cm. long, densely short-puberulent or pulverulent like the twigs, often whitish, rarely glabrous, often flattened; rachis usually similar to the peduncle and twigs in all respects, its sympodia 0.4—2.5 cm. long, mostly rather elongate; pedicels obsolete or filiform, 1—3 mm. long, densely short-puberulent or pulverulent, sometimes whitish, rarely glabrous; bracts (when present) usually only 1 or 2 pairs, subtending the lowermost cymules, foliaceous, varying from elliptic or narrow-elliptic to lanceolate or oblong, stipitate or long-stipitate, 0.5—1.5 cm. long, 1—8 mm. wide, sharply acute or spinulose at the apex, entire, glabrous and shiny above, densely canescent- or sordid-puberulent beneath, rarely glabrous, usually similar to the leaves in pubescence; bractlets numerous, a pair subtending each pair of inflorescence-branches, linear or elliptic to narrowly lanceolate or oblanceolate, sessile or subsessile, 1—4 mm. long, about 1 mm. wide, mostly densely pubescent or puberulent throughout on both surfaces, rarely glabrous, sometimes recurved; prophylla minute, linear to setaceous or subulate, sharply acute, usually about 1 mm. long, mostly densely puberulent, rarely glabrous; calyx campanulate, usually about 2 mm. long and 1 mm. wide, mostly densely whitish- or finely puberulent on the outer surface, glab-

rous within, its rim plainly 5-dentate with ovate-triangular, equal, sharply acute and more or less apiculate teeth; corolla hypanocrateriform, blue or blue-purple, usually about 5 mm. long, mostly more or less puberulent, the limb 5-fid; stamens 4, didynamous, exserted: stigma bifid; fruiting-calyx persistent, slightly enlarged, membranous or incrassate, patelliform or shallowly cupuliform, about 3 mm. long, 2--4.5 mm. in diameter, flaring, usually densely puberulent throughout on the outer surface, rarely glabrous, always glabrous on the inner surface, mostly deeply split and flattened under the mature fruit into one 2-toothed and one 3-toothed portion, the halves often divaricately spreading or appressed, mostly not split and with its rim distinctly 5-toothed when immature, rarely not split and only irregularly 5-lobed when mature, scarious-margined, often taking out with it from the fruit a slight core 1 mm. long and being removed, the teeth triangular, sharply acute, more or less uniform; fruit drupaceous, deeply 4-lobed, flattened or even conspicuously depressed-flattened, 2--5 mm. long, 4--10 mm. wide, mostly densely flavescent-short-pubescent or granular-pulverulent throughout, rarely glabrous, the lobes fleshy, usually subequal and rounded or else one lobe sometimes much attenuate and spur-like and the three other lobes each again 2-lobulate, rarely with two lobes much larger than the other two, at maturity less densely pubescent and also more attenuate at the base, mostly umbilicate at the base, often deeply so when the fruiting-calyx has been removed, composed of 2 osseous pyrenes, each 2-celled, 1-seeded, and located in the center of the drupe.

This small genus of eight known species is found in the West Indies from the Bahama Islands, through Cuba and Isla de Pinos, to Hispaniola; one species is said to occur in cultivation. The members of the genus grow at elevations from sea-level to 150 m., inhabiting mostly calcareous soil of dry hills, hillsides, dry calcareous and coastal thickets, hedges, steep mountainsides, coastal cliffs, limestone ledges and cliffs, flat rocks, coral-line soil, and streamsides. They have been collected in anthesis from March through December, and in fruit from February to April and July to November. The type of the genus is P. wrightii Millsp.

Urban was of the opinion that the genus is not distinct from Vitex Tourn., and B. L. Robinson apparently agreed. Junell states that "Die Gattung unterscheidet sich durch ihren Fruchtbau von Vitex. Die Frucht ist eine Steinfrucht mit zwei Steinen. Die Fruchtknotenbau entspricht dem bei Vitex. Die Plazenten verwachsen in der Höhe der oberen Teil der Samenanlagen. Die Fruchtblattränder sind vollkommen verwachsen. Es liegen keine Andeutungen von 'falschen' Scheidewänden vor."

In all, 349 herbarium specimens and 28 mounted photographs have been examined.

An artificial key to the species of Pseudocarpidium

1. Leaf-blades essentially glabrous beneath.

2. Lower leaf-surface (under hand-lens) densely pustulate.....
P. pungens.
- 2a. Lower leaf-surface (under hand-lens) not pustulate.
3. Twigs, peduncles, pedicels, calyx, and fruit glabrous.....
P. rigens.
- 3a. Twigs, peduncles, pedicels, calyx, and fruit densely puberulent.....*P. wrightii.*
- 1a. Leaf-blades more or less puberulent beneath.
4. Leaf-blades finely and sparsely puberulent (chiefly on the larger venation) beneath.
5. Lower leaf-surface (under hand-lens) densely pustulate throughout; leaf-blades narrow and acute at the base....
P. pungens.
- 5a. Lower leaf-surface (under hand-lens) not pustulate; leaf-blades mostly broad and rounded at the base.....
P. wrightii.
- 4a. Leaf-blades very densely puberulent throughout on the lower surface.
6. Leaf-blades essentially entire.
7. Puberulence on the lower leaf-surface white; leaf-blades cuneate at the base, to 3.7 cm. long (mostly much less), 6--10 mm. wide, oblong or oblong-lanceolate....
P. shaferi.
- 7a. Puberulence on the lower leaf-surface brownish; leaf-blades rounded or acute at the base, to 7.8 cm. long and 3.2 cm. wide, mostly elliptic....*P. avicennioides.*
- 6a. Leaf-blades spinulose-dentate.
8. Leaf-blades narrow-elliptic, abundantly short-spinulose, with 4--6 teeth per mm. of margin.....*P. multident.*
- 8a. Leaf-blades usually more broadly elliptic, more remotely spinulose.
9. Hispaniolan; teeth large and coarse, rather uniform; leaf-apex triangular-acuminate and long-spined.....
P. domingense.
- 9a. Cuban; teeth small, often very irregular, distant, or even absent; leaf-apex rounded in outline, short-apiculate or merely acute.
10. Lower leaf-surface very strikingly reticulate with prominently elevated venation, the puberulence on the venation sparser and brownish, that on the interstices very dense and white.....*P. ilicifolium.*
- 10a. Lower leaf-surface with usually only the midrib and secondaries prominently elevated, not strikingly reticulate, uniformly grayish- or brownish-puberulent throughout.....*P. avicennioides.*

PSEUDOCARPIDIUM AVICENNIOIDES (A. Rich.) Millsp., Publ. Field Columb. Mus. Bot. 2: 182. 1906.

Synonymy: *Vitex avicennioides* A. Rich. in Sagra, Hist. Fis. Cuba 11, Bot. 2: 149. 1850.

Literature: A. Rich. in Sagra, Hist. Fis. Cuba 11, Bot. 2: 149. 1850; Griseb., Cat. Pl. Cub. 216. 1866; Jacks., Ind. Kew. 2: 1213. 1895; Millsp., Publ. Field Columb. Mus. Bot. 2: 182. 1906; Moldenke, Geogr. Distrib. Avicenn. 5. 1939; Moldenke, Prelim. Alph. List Invalid Names 50. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 99. 1942; Moldenke, Alph. List Invalid Names 52. 1942; Moldenke, Alph. List Cit. 1: 61, 64, 75, 109, 184, 185, 187, 321, & 322 (1946), 2: 543 & 647 (1948), 3: 664 (1949), and 4: 986 & 1143. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44 & 195. 1949; Moldenke, Phytologia 5: 151. 1955; Alain in León & Alain, Fl. Cuba 4: 314 & 315, fig. 136. 1957; Moldenke, Résumé 53, 381, & 468. 1959.

Illustrations: Alain in León & Alain, Fl. Cuba 4: fig. 136. 1957.

A shrub or small tree, to 6 m. tall; branchlets and twigs rather slender, obscurely tetragonal or subterete, light-gray or brownish, densely short-puberulent, becoming glabrescent in age, rather rigid; nodes mostly distinctly annulate, at least on younger wood; principal internodes 0.5--2.5 cm. long, sometimes greatly abbreviated on very short spur-like twigs; leaves decussate-opposite, simple, often crowded on short twigs, frequently very revolute; petioles very slender, 1.5--7 mm. long, densely puberulent with canescent or flavescent hairs, not jointed; leaf-blades subcoriaceous or coriaceous, light- or dark-green above, cinereous beneath, narrowly elliptic, 2.5--7.8 cm. long, 1--3.2 cm. wide, sharply acute and often spinulose at the apex, varying from acute to obtuse or even cordate at the base, varying from entire and more or less revolute to irregularly spinulose-dentate along the margins, densely puberulent above when immature, glabrous and shiny when mature, always densely short-pubescent, puberulent, or even tomentulose with canescent or sordid hairs beneath; midrib slender, mostly subimpressed above, very strong and prominent beneath; secondaries slender, 6--10 per side, short, divergent from the midrib at almost right angles or ascending, usually conspicuously anastomosing near the margins beneath, subprominent (sometimes in a slight channel) or obscure above, usually very conspicuously prominent beneath; vein and veinlet reticulation fine and abundant, obscure or subprominent to the finest detail above, only the larger portions prominent beneath; inflorescence axillary, paniculate, 4--10 cm. long, 1--3.5 cm. wide, solitary or paired, usually composed of 3 or 4 pairs of rather few-flowered cymes and a terminal one, the larger ones often bracteate; peduncles very slender, 1.4--5.5 cm. long, densely puberulent like the twigs; rachis similar to the peduncle in all respects, its sympodia mostly rather elongated; pedicels filiform, about 1 mm. long and densely puberulent, or obsolete; bracts, when present, one pair, subtending the lowermost cymes, foliaceous, narrow-elliptic, stipitate, to 1.5 cm. long and 6 mm. wide, sharply acute, entire, glabrous and shiny above, densely canescent- or sordid-puberulent beneath; bractlets numerous, linear, sessile, 1--4 mm. long, densely pubescent

throughout on both surfaces; prophylla minute, setaceous or subulate, densely puberulent; fruiting-calyx slightly enlarged, densely puberulent throughout outside, deeply split and flattened under the mature fruit into one 2-toothed and one 3-toothed portion; fruit deeply 4-lobed, flattened, 3--5 mm. long, 6--8 mm. wide, densely flavescent-short-pubescent throughout, the lobes usually subequal and rounded, at maturity less densely pubescent and more attenuate at the base, umbilicate at the base.

The type of this species was collected by Jean Jules Linden (no. 2053) in the Cerro de Cobre, near Santiago, Oriente, Cuba, in July or August, 1844. The species inhabits hillsides, coastal thickets, dry hills, coralline soil, and limestone cliffs, often facing bays or even depressed by the action of wind over flat rocks, ascending from sea-level to 150 meters altitude. It has been collected in anthesis in April, June, July, August, and October, and in fruit in March, September, and October. The leaf-margins vary tremendously, as do also the shape of the leaf-blade and the shape of the leaf-base, often on the same branch. The leaves and stems are frequently attacked by gall-insects, which produce crateriform galls on them. Scale-insects are frequently found on the lower leaf-surface, and species of *Tillandsia* often grow on the branches. Specimens of this species have been confused in herbaria with *P. pungens* Britton, *P. shaferi* Britton, *P. wrightii* Millsp., and with the genera *Duranta* L. and *Cornutia* Plum. — in fact, specimens have been annotated as "*Cornutia* n. sp." and as *Vitex ilicifolia* A. Rich.

A packet of *C. Wright* 431 in the herbarium of the Field Museum at Chicago is marked "type" of *P. wrightii* in error, and a fragment of *Linden* 2053 in the same herbarium is labelled "So. America" in error. The *N. Taylor* 19 cited by Britton as *P. pungens* is certainly *P. avicennioides* instead!

In all, 66 herbarium specimens, including the type collection, and 7 mounted photographs have been examined.

Citations: CUBA: Oriente: *Acuffa* 10207 (Es); *Alain, Clément, & Chrysogone* A.838 (N); *Alain & López Figueiras* 4206 (Z); *N. L. Britton* 1920 (N, N); *Britton & Cowell* 12732 (B, N, W-698403); *Bucher* 5 (F-598896); *Clément* 125 (Ha, N), 279 (Ha, N), 2236 (Ha, N), 2675 (Ha, N), 2688 (Ha); *Ekman* 2867 (B, S), 7826 (B, N, S), 7835 (B, N-photo, S, Z-photo), 15616 (B, S); *Hioram* 2046 (N); *León* 11666 [Herb. Roig 5794] (Es, Ha, N), 12375 (Ha, N), 16370 (Ha, N), 17691 (Ha, N); *Linden* 2053 (B-isotype, B-photo of isotype, Bm-isotype, Br-isotype, Br-isotype, Cb-isotype, F-600265-isotype, F-976357-isotype, K-isotype, K-isotype, K-isotype, K-photo of isotype, N-isotype, N-photo of isotype, P-isotype, S-photo of isotype, X-isotype, Z-photo of isotype), 2054 (B, Br); *N. Taylor* 19 (N); *C. Wright* 431, in part [1856-7] (B, Br, Cb, D-611964, E-116125, F-181690, F-870972, G, K, N, Os, T, X).

PSEUDOCARPIDIUM DOMINGENSE (Urb. & Ekm.) Moldenke, Revist. Sudam. Bot. 5: 2. 1937.

Synonymy: Vitex domingensis Urb. & Ekm., Arkiv Bot. 22A (10): 107. 1929.

Literature: Urb. & Ekm., Arkiv Bot. 22A (10): 107. 1929; Hill, Ind. Kew. Suppl. 8: 249. 1933; Moldenke, Revist. Sudam. Bot. 5: 2. 1937; Moldenke, Geogr. Distrib. Avicenn. 7. 1939; Moldenke, Prelim. Alph. List Invalid Names 50. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 26 & 99. 1942; Moldenke, Alph. List Invalid Names 53. 1942; Moldenke, Alph. List Cit. 1: 188 & 189. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 185. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 48 & 195. 1949; Moldenke, Phytologia 5: 151. 1955; Moldenke, Résumé 57, 383, & 468. 1959.

Shrub or small tree; branchlets and twigs rather slender, stiff, obscurely tetragonal or subterete, gray, the youngest parts densely short-puberulent, the older parts glabrescent; nodes usually not noticeably annulate (or annulate only on the youngest twigs), usually slightly swollen; principal internodes 0.2–4.3 cm. long, usually much abbreviated; leaves decussate-opposite, abundant and crowded, simple, decidedly holly-like, stiff and prickly; petioles very slender, 1–4 mm. long, rather densely pulverulent and puberulent; leaf-blades coriaceous, bright-green above, cinereous beneath, elliptic, 1–5.7 cm. long, 0.5–2.3 cm. wide, mostly very irregular in size and shape on the same branch, acute or acuminate and usually long-spinulose at the apex, acute at the base, irregularly spinulose-dentate with mostly large and coarse triangular teeth and elongated spines along the margins, undulate and sinuate, usually more or less asymmetric, densely granular-pulverulent above, becoming glabrous and shiny in age, very densely short-tomentulose with matted cinereous or sordid tomentum beneath and usually also more or less granular-pulverulent on the midrib and larger venation or sometimes only pulverulent and only sparsely puberulent; midrib slender, subimpressed above, very strong and prominent beneath; secondaries slender, 3–10 per side, usually very irregular, mostly subimpressed (or subprominent in a shallow channel) above, very strong and prominent beneath, often slightly webbed at the base, arcuate-ascending, often conspicuously anastomosing near the margins; vein and veinlet reticulation abundant, mostly rather obscure above, very prominent beneath; inflorescence axillary, paniculate, 2.5–6.5 cm. long, 1.5–4 cm. wide, composed of 2–4 pairs of often irregularly disposed rather few-flowered cymules and a terminal one, very tenuous, densely short-puberulent and pulverulent throughout, often bracteate; peduncles (1–4 cm. long) and rachis very slender or filiform, the sympodia mostly rather elongate; pedicels filiform, 1–2 mm. long, densely puberulent and pulverulent; bracts, when present, foliaceous, elliptic, stipitate, to 7 mm. long and 3 mm. wide, entire, similar to the leaves in pubescence; bractlets linear or elliptic, puberulent, 1–4 mm. long; prophylla minute, subulate-setaceous;

corolla blue; fruiting-calyx slightly enlarged, flattened under the mature fruit and deeply split into two divergent halves, one half 2-toothed and the other 3-toothed, densely puberulent throughout; fruit flattened, about 3 mm. long and 6 mm. wide, 4-lobed with subequal rounded lobes, densely short-pubescent with flavescent hairs and granular-pulverulent.

The type of this handsome species was collected by Erik Leonard Ekman (no. H.8489) on Eocene limestone at Presqu'île du Nord-Ouest, Les Gonaïves, towards La Pierre, Haïti, on June 19, 1927, and is deposited in the herbarium of the Botanisches Museum at Berlin. The species is said by Ekman to inhabit coastal cliffs, limestone cliffs, and steep mountainsides, and to be "not common". It is, however, said to be fairly abundant on Quaternary and Eocene limestone formations. It has been collected in anthesis in June, July, September, and October, and in fruit in July and September. In all, 23 herbarium specimens, including the type, and 6 mounted photographs have been examined.

Citations: HISPANIOLA: Dominican Republic: Ekman H.6941 (B, N, N—photo, S, Z—photo). Haïti: Ekman H.4532 (B, N, S, W—1304709), H.6996 (B, F—839450, Mi, S), H.7096 (B, S, W—1304612), H.8489 (B—type, F—839445—isotype, Mi—isotype, N—isotype, N—photo of type, N—photo of isotype, S—isotype, W—1413094—isotype, W—1479718—isotype, Z—photo of type, Z—photo of isotype), H.8673 (B, S).

PSEUDOCARPIDIUM ILICIFOLIUM (A. Rich.) Millsp., Publ. Field Columb. Mus. Bot. 2: 182. 1906.

Synonymy: Vitex ilicifolia A. Rich. in Sagra, Hist. Fis. Cuba 11, Bot. 2: 148, pl. 64. 1850.

Literature: A. Rich. in Sagra, Hist. Fis. Cuba 11, Bot. 2: 148, pl. 64. 1850; Sagra, Fl. Cub. 4, Atlas Pl. Vasc., ed. 1, pl. 64 (1853) and ed. 2, pl. 64. 1863; Griseb., Cat. Pl. Cub. 217. 1866; Nicholson, Illustr. Dict. Gard. 4: 186. 1884—1886; Jacks., Ind. Kew. 2: 1213. 1895; Millsp., Publ. Field Columb. Mus. Bot. 2: 182. 1906; Rehd. in L. H. Bailey, Stand. Cycl. Hort. 6: 3481. 1917; Stapf, Ind. Lond. 6: 478. 1931; Junell, Symb. Bot. Upsal. 4: 94. 1934; Moldenke, Geogr. Distrib. Avicenn. 5 & 39. 1939; Moldenke, Alph. List Common Names 8, 22, & 25. 1939; Moldenke, Prelim. Alph. List Invalid Names 50. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25, 74, & 99. 1942; Moldenke, Alph. List Invalid Names 53. 1942; Moldenke, Phytologia 2: 111. 1944; Moldenke, Alph. List Cit. 1: 186 & 187 (1946), 2: 651 (1948), 3: 868 & 880 (1949), and 4: 1137 & 1143. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44, 163, & 195. 1949; Roig, Dicc. Bot. 2: 1115. 1953; Moldenke, Phytologia 5: 151. 1955; Alain in León & Alain, Fl. Cub. 4: 314, 315, & 545. 1957; Moldenke, Résumé 53, 222, 384, & 468. 1959.

Illustrations: A. Rich. in Sagra, Hist. Fis. Cuba 11, Bot. 2: pl. 64. 1850; Sagra, Fl. Cub. 4, Atlas Pl. Vasc., ed. 1, pl. 64 (1853) and ed. 2, pl. 64. 1863; Nicholson, Illustr. Dict. Gard. 4:

186. 1884—1886.

Shrub or small tree, to 8.5 m. tall; branchlets and twigs slender, gray, obscurely tetragonal or subterete, stiff, the youngest parts densely short-puberulent with flavescent or sordid hairs; nodes slightly annulate on the youngest parts, not noticeably so on older wood, slightly swollen; principal internodes 0.2—4 cm. long, mostly greatly abbreviated; leaves decussate-opposite, simple; petioles slender, 3—9 mm. long, flattened above, densely short-puberulent; leaf-blades subcoriaceous or coriaceous, dark-green and often rather shiny above, cinereous or silvery beneath, elliptic, 2—8 cm. long, 1—3.5 cm. wide, obtuse or acute and usually spinulose at the apex (rarely emarginate), obtuse or acute at the base, rarely subcordate, irregularly spinulose-dentate (or rarely subentire) along the margins, usually more or less undate and sinuate and slightly revolute, often asymmetric, puberulent or pulverulent above (becoming glabrous in age), densely short-pubescent beneath (but not so dense as to hide the veinlet reticulation) with cinereous hairs; midrib slender, subimpressed or flat above and usually puberulous, very strong and prominent to the apex beneath; secondaries slender, 4—10 per side, short, irregular, issuing at almost right angles to the midrib or slightly ascending, subimpressed and puberulous or obscure above, prominent beneath, anastomosing near the margins; vein and veinlet reticulation indiscernible above, very abundant and conspicuously prominent to the finest detail beneath, appearing much darker than the cinereously pubescent lamina; inflorescence axillary, paniculate, 4—9.5 cm. long, 1—4 cm. wide, composed of 3—6 pairs of very lax usually 3-flowered cymules, often quite irregular, very slender and tenuous throughout; peduncles (0.5—2.5 cm. long) and rachis very slender or filiform, rather densely puberulent like the petioles and twigs, the sympodia mostly elongate; bracts (when present) foliaceous, elliptic, usually only 1 or 2 pairs subtending the lowermost cymes, entire, stipitate, to 1.5 cm. long and 8 mm. wide, spinulose at the apex, resembling the leaves in puberulence; bractlets linear, numerous, 1—4 mm. long, often recurved, puberulent throughout; prophylla minute, linear or subulate, about 1 mm. long, puberulent; corolla blue; fruiting-calyx slightly enlarged, flattened under the mature fruit and split into 2 divaricate-spreading or appressed halves, one half 2-toothed and the other 3-toothed, puberulent, throughout on the outside; fruit flattened, 2—3 mm. long, 5—6 mm. wide, 4-lobed, densely short-puberulent throughout, the lobes subequal and rounded.

The type of this species was collected by Ramón de la Sagra at Canasi, Cuba, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris. The species has been collected in anthesis in June, July, November, and December, and in fruit in July. It has been found along streams, in hedges, on limestone ledges and the edges of cliffs, on limestone rocks, and is said to be common in calcareous soil and hills. P. Wilson 11401 is from a tree which had the base of the trunk 18 inches in

diameter, its leaves are unusually large, the petioles long, the under-surface silvery, and the calyx and corolla large. Roig and León report that the wood is used. Mostly the leaf-blades are more or less puberulent above. Rehder reports that the species occurs in cultivation, but I have as yet seen no cultivated material of it. Herbarium material of this species has been confused with P. wrightii and has even been misidentified as Vitex avicennoides A. Rich., but its conspicuous vein and veinlet reticulation on the lower leaf-surface distinguishes it at once. In all, 41 herbarium specimens, including the type, and 3 mounted photographs have been examined.

Vernacular names reported are "chicharrón", "granadillo de costa", "navaja de verraco", "pico de cotorra", and "yanilla blanca".

Citations: CUBA: Camagüey: Roig, Luaces, & Arango 417 [Herb. Roig 815a] (Rg). Havana: León & Roig 11443 (Ha, N); Roig 8134 (Es); Roig & Acuña s.n. (Es--14055, Es); Roig & León s.n. [Herb. Roig 2523] (Es). Las Villas: León 14619 (Ha). Matanzas: Ekman 17215 (B, S); Rugel 310 (B, B, Bm, D, G, K, K, Le, Le, Le, N), 806 (M, N), s.n. [Punta Brava, 1849] (Bm, M); Sagra s.n. [Canasi] (P--type, P--isotype); Seifríz s.n. [León 17954] (Ha). Oriente: Ekman 8945 (B, S). Pinar del Río: Ekman 13027 [13037] (B, E--photo, N, N--photo, S, Z--photo); P. Wilson 11401 (N, N). Province undetermined: C. Wright 100 (B), 431, in part [1865; Herb. Sauvalle 1786] (Hv), 431, in part [no date] (F--183051, Pa, S, T, W--58257). LOCALITY OF COLLECTION UNDESIGNATED: Herb. Mus. Nac. Hist. Nat. Chile 68285 (Sg).

PSEUDOCARPIDIUM MULTIDENS (Urb.) Moldenke, Revis. Sudam. Bot. 5: 2. 1937.

Synonymy: Vitex multidens Urb. in Fedde, Repert. 20: 346. 1924.

Literature: Urb. in Fedde, Repert. 20: 346. 1924; Hill, Ind. Kew. Suppl. 7: 252. 1929; Moldenke, Revis. Sudam. Bot. 5: 2. 1937; Moldenke, Alph. List Common Names 9. 1939; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Prelim. Alph. List Invalid Names 51. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 99. 1942; Moldenke, Alph. List Invalid Names 54. 1942; Moldenke, Phytologia 2: 111. 1944; Moldenke, Alph. List Cit. 1: 185. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 185. 1947; Moldenke, Alph. List Cit. 2: 647. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44 & 195. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 11. 1949; Roig, Dicc. Bot. 1: 344--345 and 2: 1115. 1953; Moldenke, Phytologia 5: 152. 1955; Alain in León & Alain, Fl. Cuba 4: 314--316 & 545. 1957; Moldenke, Résumé 53, 386, & 468. 1959.

Shrub or low tree; branchlets and twigs rather slender, very obtusely tetragonal or subterete, buff or gray, the younger parts finely short-puberulent with flavescent puberulence, becoming gla-

brescent in age; leaf-scars not prominent; nodes on younger parts distinctly annulate, less so on older wood; principal internodes 0.3--2 cm. long, often much abbreviated on stunted twigs; leaves decussate-opposite, simple, often crowded on very short twigs; petioles slender, 2--7 mm. long, densely short-puberulent like the young twigs, flattened above, not ampliate at the base; leaf-blades coriaceous, bright- or dark-green above, very pale or whitish beneath, oblong or narrowly elliptic, rarely oblanceolate, 0.9--8 cm. long, 0.4--2.3 cm. wide, acute and spinulose at the apex, obtuse at the base, abundantly spinulose-dentate from the base to the apex or sometimes entire near the base (rarely subentire throughout on stunted or immature leaves), glabrous and shiny above, very densely short-tomentulose beneath with whitish hairs, sometimes slightly subrevolute or undulate; midrib slender, usually slightly impressed above, strong and prominent beneath; secondaries very slender, numerous and close together, 6--18 per side, short, slightly ascending, varying from subimpressed to slightly prominulent above, prominulent and rather conspicuously anastomosing or arcuately joined near the margins beneath; vein and veinlet reticulation obscure, or the larger parts more or less prominulent on both surfaces; inflorescence axillary and terminal, paniculate, rather loosely many-flowered, 4--6 cm. long, 1--2.5 cm. wide, composed of about 4 pairs of about 3-flowered cymes and a terminal one; peduncles filiform, flattened, 1.4--1.6 cm. long, densely short-puberulent like the twigs; rachis similar to the peduncle, its sympodia elongate; pedicels filiform, 1--2 mm. long, densely puberulent; bracts few, lanceolate or oblong, 5--7 mm. long, 1--2 mm. wide, entire, stipitate, densely puberulent; bractlets linear, numerous, 1--2 mm. long, densely puberulent; prophylla subulate-setaceous, minute, densely puberulent; fruiting-calyx patelliform, slightly enlarged, densely puberulent outside, not split, its rim distinctly 5-toothed; immature fruit flattened, distinctly and regularly 4-lobed with rounded lobes, densely short-pubescent throughout.

The type of this species was collected by Erik Leonard Ekman (no. 7728) in dry calcareous thickets between the city of Santiago and El Morro, Oriente, Cuba, on September 25, 1916, and is deposited in the herbarium of the Botanisches Museum at Berlin. It is said to inhabit dry thickets on coastal hillsides. It has been collected in anthesis and in fruit from July to September. Herbarium material has been misidentified as P. avicennioides (A. Rich.) Millsp. Vernacular names recorded for it are "chicharran", "chicharrón", "copalillo", and "granadillo de costa". It is worth noting that the name "chicharrón" is applied also to P. wrightii Millsp., and is, in fact, applied throughout Cuba to various plants, mostly trees with hard wood, which have thick coriaceous leaves, most especially to Terminalia eriostachya A. Rich. In all, 8 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: CUBA: Oriente: Ekman 7728 (B--type, E--photo of

isotype, N--isotype, N--photo of type, N--photo of isotype, S--isotype, Z--photo of type, Z--photo of isotype); León 11652 (Ha, N), 17136b (Ha). Province undetermined: C. Wright 23 [Herb. Savalle 1788] (Hv, Hv).

PSEUDOCARPIDIUM PUNGENS Britton, Bull. Torrey Bot. Club 39: 10. 1912.

Literature: N. L. Britton, Bull. Torrey Bot. Club 39: 10. 1912; Prain, Ind. Kew. Suppl. 5: 209. 1921; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 99. 1942; Moldenke, Alph. List Cit. 1: 61. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44 & 195. 1949; Alain in León & Alain, Fl. Cuba 4: 314, 316, & 545. 1957; Moldenke, Résumé 53 & 468. 1959.

Tree, to 8 m. tall; branchlets and twigs rather slender, densely short-puberulent on the younger parts with brownish hairs, becoming glabrate and light-gray in age, rather obtusely tetragonal on the younger parts, subterete in age, stiff; nodes on younger parts distinctly annulate; principal internodes much abbreviated, 0.5--2.3 cm. long or less; leaves decussate-opposite, simple; petioles slender, 2--6 mm. long, densely short-puberulent with brownish hairs like the young twigs, very slightly ampliate at the base, flattened above; leaf-blades coriaceous [not "chartaceous" as stated by Britton!], light- or somewhat gray-green on both surfaces or somewhat darker beneath, varying from oblong or oblong-lanceolate to narrowly elliptic, 2.8--7 cm. long, 1.2--2 [not "3" as stated by Britton!] cm. wide, acuminate and spinulose at the apex, obtuse or subacute at the base, rather irregularly spinulose-dentate along the margins except toward the base and near the apex, sometimes subentire, glabrous and shiny above, dull beneath, glabrate and decidedly pustulate on the lamina beneath or more or less short-puberulent on the midrib and larger venation, often more or less revolute; midrib slender, usually somewhat impressed above, very strong and prominent beneath; secondaries slender, strong, 7--13 per side, slightly ascending, short, not much arcuate, but conspicuously anastomosing near the margins beneath, obscure or slightly prominent above, prominent beneath; vein and veinlet reticulation very fine and abundant, slightly prominent to the finest divisions above, only the larger portions prominent beneath; inflorescence axillary, much abbreviated, few-flowered; calyx campanulate, about 2 mm. long and wide, finely puberulent outside, glabrous within, its rim plainly 5-dentate with more or less apiculate teeth; corolla not known; fruiting-calyx somewhat enlarged, about 3 mm. long, puberulent outside, deeply split into two parts under the mature fruit, on part 3-lobed and the other 2-lobed; fruit flattened, very irregularly 4-lobed, 4--5 mm. long, 4--10 mm. wide, one lobe often much attenuate and spur-like, the other 3 lobes often each again slightly 2-lobulate, densely puberulent throughout, umbilicate at the base.

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NOTES ON BROMELIACEAE, XIII

Lyman B. Smith

TROPICAL AMERICA

GUZMANIA LINGULATA (L.) Mez in DC. Monogr. Phan. 9:899. 1896.

1. Leaves more than 25 mm. wide; plants large; floral bracts strongly cucullate; flowers numerous.
2. Outer (involucral) bracts of the inflorescence erect, red or pink.
 3. Leaves concolorous.....A. Var. *lingulata*
 3. Leaves marked with red-purple longitudinal stripes.
 - B. Var. *splendens*
 2. Outer (involucral) bracts of the inflorescence spreading, bright scarlet.....C. Var. *cardinalis*
1. Leaves usually not more than 25 mm. wide; plants small; floral bracts weakly cucullate; flowers few.
 4. Leaf-sheaths concolorous with the blades; outer (involucral) bracts of the inflorescence red.....D. Var. *minor*
 4. Leaf-sheaths castaneous; outer (involucral) bracts of the inflorescence bright scarlet.....E. Var. *flammea*

A. GUZMANIA LINGULATA var. LINGULATA

Tillandsia lingulata L. Sp. Pl. 286. 1753.

B. GUZMANIA LINGULATA var. SPLENDENS (Planch.) Mez, Pflanzenreich IV. Fam. 32:609. 1935.

Caraguata splendens Planch. Fl. Serres 11:31, pl. 1091. 1856;

A. Dietr. in Otto & Dietr. Allg. Gartenzeit. 24:96, pl. 3. 1856. Priority verified by Robert C. Foster.

C. GUZMANIA LINGULATA var. CARDINALIS (André) André ex Mez in DC. Monogr. Phan. 9:900. 1896.

Caraguata cardinalis André, Rev. Hortic. 55:12, pl. 1883.

Guzmania cardinalis (André) Mez, Pflanzenreich IV. Fam. 32:609. 1935.

D. GUZMANIA LINGULATA var. MINOR (Mez) L. B. Smith & Pittendrigh, comb. nov.

Guzmania minor Mez in DC. Monogr. Phan. 9:901. 1896.

E. GUZMANIA LINGULATA var. FLAMMEA (L. B. Smith) L. B. Smith & Pittendrigh, comb. nov.

Guzmania minor var. flammea L. B. Smith, Caldasia 5:4. 1948.

Field observations in Trinidad by C. S. Pittendrigh indicate that what have been considered three distinct species by Mez, Guzmania lingulata, G. cardinalis, and G. minor, intergrade to such an extent that they can be no more than varieties. On the other hand, G. cardinalis shows strong varietal characters that

are obscured or lost in dried material, and thus it should not be reduced to typical G. lingulata as I have done previously.

VENEZUELA

GREIGIA ARISTEGUIETAE L. B. Smith, sp. nov.

A G. sodiroana Mez, cui affinis, foliorum vaginis atro-castaneis, laminis glabris differt.

Caulescent; leaves spreading, to 1 meter long; sheaths ovate, 8 cm. long, entire, dark castaneous with narrow pale margins, very sparsely appressed-lepidote beneath; blades linear, acuminate, slightly narrowed toward base, to 16 mm. wide, obscurely serrulate toward base and apex, glabrous; scapes lateral, 4 cm. long; inflorescences subglobose, 35 mm. long, few-flowered, depauperately compound with 1-2-flowered branches; outer (scape- and primary) bracts broadly ovate, acute, to 30 mm. long, bearing a few curved teeth near apex, dark castaneous with narrow pale margins, glabrous; floral bracts lanceolate, mucronate, ca. 2 cm. long; sepals lance-oblong, mucronate, 17 mm. long, dark castaneous; fruit ellipsoid, 2 cm. long. Pl. I, fig. 1: Leaf-base x $1/2$; fig. 2: Inflorescence x $1/2$; fig. 3: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,281,423, collected on the ground in deep shade of forest, Guirigay, State of Trujillo, Venezuela, altitude ca. 3300 meters, August 1958, by L. Aristeguieta (No. 3591). Isotypes (NY, VEN).

NAVIA CARDONAE L. B. Smith, sp. nov.

A N. cucullata L. B. Smith, cui affinis, vaginis foliorum angustioribus, bracteis florigeris acuminatis sepala superantibus differt.

Caulescent, branching; leaves very many, to 9 cm. long, barbellate in the axils of the lower spines, otherwise glabrous, the inner leaves not distinctively colored; sheaths broadly ovate, 10 mm. wide, entire, red-brown; blades linear, acuminate, 2.5 mm. wide, not narrowed toward base, stiff, subpungent, even above, obscurely nerved beneath, finely spinulose-serrate throughout; inflorescence terminal, sessile, simple, narrowly ellipsoid, 20 mm. long, 6 mm. in diameter, nearly glabrous; floral bracts ovate, acuminate, exceeding the sepals, carinate, thin, red-brown, the lowest serrulate near apex; sepals free, sublinear, cucullate, 10 mm. long, the posterior ones narrowly alate-carinate; ovary superior. Pl. I, fig. 4: Leaf-base x 1; fig. 5: Inflorescence x 1; fig. 6: Posterior sepal x 2.

Type in the Instituto Botánico, Caracas, No. 18517, collected by the Río Canaracuni (tributary of the Río Caura), State of Bolívar, Venezuela, altitude 400 meters, February 21, 1940, by F. Cardona (No. 349).

PITCAIRNIA MICROCALYX var. SCHLIMII (Baker) L. B. Smith, comb. nov.

Pitcairnia schlimii Baker, Handb. Bromel. 100. 1889.

Pitcairnia caracasana Baker, Handb. Bromel. 103. 1889.

Flowers red instead of yellow, otherwise indistinguishable from variety microcalyx.

PITCAIRNIA MICROCALYX var. ELLIPTICA L. B. Smith, var. nov.

A var. microcalyx bracteis florigeris ellipticis, floribus rubris, sepalis oblongis subacutis differt.

Type in the Instituto Botánico, Caracas, collected above La Sabana de las Piedras, Cerro Negro, northwest of Caripe, State of Monagas, Venezuela, altitude 1500-2180 meters, April 15, 1945, by J. A. Steyermark (No. 62077). Isotypes (F, GH).

PUYA CARDONAE L. B. Smith, sp. nov.

A P. santanderensis Cuatr., cui maxime affinis, sepalis minoribus, indumento ferrugineo differt.

Flowering about 3 dm. high; leaves numerous, 3 dm. long (incomplete, estimated); sheaths suborbicular, 35 mm. in diameter, dark castaneous and sparsely serrulate toward apex, glabrous; blades linear, 15 mm. wide, glabrous above, covered beneath with appressed cinereous scales, laxly serrate with straight or uncinate blackish brown spines 3 mm. long; scape erect, stout; scape-bracts densely imbricate, elliptic, dark brown and subchartaceous when dry, ferruginous-lanate quickly becoming glabrous except along the margins, the lower ones foliaceous-laminate; inflorescence simple, subglobose, 6 cm. long, ferruginous-lanate but the bracts soon glabrous except the margins; floral bracts straight, densely imbricate, ovate, acuminate, 5 cm. long, exceeding the flowers, entire, membranaceous, dark brown with finely crisped margins when dry; pedicels stoutly obconic, 3 mm. long; sepals lanceolate, obtuse, 15 mm. long; petals naked, ca. 3 cm. long, twisted together after anthesis. Pl. I, fig. 7: Inflorescence x 1/4; fig. 8: Flower x 1; fig. 9: Denuded sepal x 1.

Type in the Instituto Botánico, Caracas, No. 18562, collected on the Páramo de Tamá, State of Táchira, Venezuela, altitude 3100-3300 meters, July 1939, by F. Cardona (No. 335).

ECUADOR

GUZMANIA FOSTERIANA L. B. Smith, sp. nov.

A G. strobilantha (R. & P.) Mez, cui affinis, stolonibus brevibus erectis procreante, rosulis dense aggregatis, foliorum vaginis ad basin versus longe atro-castaneis differt.

Reproducing by short erect stolons covered by dark castaneous scales, the rosettes densely aggregated; flowering shoots ca. 4 dm. high; leaves 2-3 dm. long, subdensely brown-punctulate beneath; sheaths ovate, 5-8 cm. long, their basal half dark castaneous; blades linear, acuminate, 10-15 mm. wide, green, concolorous; scape erect, slender; scape-bracts imbricate, closely enfolding the scape, the lowest subfoliaceous, the others lanceolate, acuminate, chartaceous, nerved, dull, stramineous when dry; inflorescence simple, ellipsoid or subglobose, 3 cm. long, rather few-flowered; floral bracts broadly ovate, apiculate, to 15 mm. long, exceeding the sepals, ecarinate, subcoriaceous, even, gla-

brous, sublustrous, stramineous or pale green when dry; pedicels obconic, stout, 2 mm. long; sepals elliptic, broadly rounded at apex, 11 mm. long, connate for 5 mm., coriaceous, glabrous, the posterior ones alate-decurrent on the pedicel; petals highly conglutinated, naked, white, the blades spreading, elliptic, 7 mm. long; stamens included. Pl. I, fig. 10: Inflorescence x 1; fig. 11: Calyx x 1; fig. 12: Sepal x 1.

Type in the U. S. National Herbarium, No. 1,985,915, collected on tree, Province of Pichincha, Ecuador, altitude 1350 meters, December 9, 1948, by Mulford B. Foster (No. 2638).

ECUADOR: West of Ducur on the Cuenca-Guayaquil road, alt. 960 m., 1956, cult. Montréal Bot. Gard., 1958, H. Teuscher 2118-56 (US).

ECUADOR, PERU

GUZMANIA VARIEGATA L. B. Smith, sp. nov.

A G. squarrosa (Mez & Sodiro) Smith & Pittendrigh, cui verisimiliter affinis, sepalis liberis vel subliberis haud marginatis, fasciculis plurifloris differt.

Stemless, flowering 5-8 dm. or higher; leaves many in a spreading rosette, 7 dm. long, covered with appressed pale brown-centered scales; sheaths distinct, elliptic, brown; blades ligulate, acute, 4-5 cm. wide, green, concolorous; scape erect, much shorter than the leaves; scape-bracts foliaceous, large, densely imbricate but with spreading blades; inflorescence laxly bipinnate, 3-6 dm. long; axis nearly straight, ca. 8 mm. in diameter, glabrous, more or less sulcate when dry; primary bracts spreading, obscurely lepidote, broadly ovate, the lower with large red and green subfoliaceous blades; fascicles short-stipitate, stout-ellipsoid, about 10-flowered; floral bracts elliptic, obtuse, slightly cucullate, 30 mm. long, equaling or exceeding the sepals, rather thin, nerved, lepidote; pedicels short, stout; sepals elliptic, obtuse, 22-25 mm. long, free or short-connate, thin, nerved, green, sparsely lepidote within; petals 4 cm. long, highly conglutinated, naked, white, the blades erect, narrowly elliptic, obtuse; stamens included. Pl. I, fig. 13: Inflorescence after photo; fig. 14: Spike x 1/2; fig. 15: Flower x 1.

Type in the U. S. National Herbarium, No. 2,252,568, collected at Tambo Pass, Canchaque, Department of Piura, Peru, altitude 3800 meters, December 15, 1956, by W. Rauh.

ECUADOR: Oro: On tree, between La Chorita and Portovelo (gold mine near Zaruma), alt. 1000-2000 m., Aug. 28, 1923, Hitchcock 21179 (GH, US). Loja: Epiphytic, Porto Velo, road to Cachicaran, alt. 750 m., Nov. 30, 1948, Foster 2600 (US).

TILLANDSIA KUNTHIANA Gaud. Atl. Voy. Bonite pl. 53. 1842; cf. I.

M. Johnston, Journ. Arn. Arb. 25:487. 1944.

Tillandsia latifolia Meyen, Reise 437. 1843.

TILLANDSIA KUNTHIANA var. DIVARICATA (Benth.) L. B. Smith, comb. nov.

Tillandsia divaricata Benth. Bot. Voy. Sulph. 174. 1846.

Tillandsia latifolia var. divaricata (Benth.) Mez in DC. Monogr. Phan. 9:789. 1896.

TILLANDSIA KUNTHIANA var. MAJOR (Mez) L. B. Smith, comb. nov.

Tillandsia latifolia var. major Mez in DC. Monogr. Phan. 9:790. 1896.

GUIANA

AECHMEA BASI-LATERALIS (Lem.) L. B. Smith, comb. nov.

Disteganthus basi-lateralis Lem. Fl. des Serres 3: pl. 227. 1847.

Although Disteganthus does not seem to be separable from Aechmea as a genus, the species, D. basi-lateralis, is quite distinct and so the necessary combination is made here.

BRAZIL

DYCKIA MELLO-BARRETOI L. B. Smith, sp. nov.

A D. sordida Baker, cui affinis, inflorescentiae lepidibus adpresso-stellatis plus minusve deciduis, bracteis florigeris superioribus apiculatis, stylo distincto differt.

Known only from fragments but apparently flowering over 1 meter high; leaves over 3 dm. long; sheaths unknown; blades narrowly triangular, acuminate to an abruptly acute pungent apex, 15 mm. wide, pale-lepidote between the nerves on both sides, very laxly serrate with slender spreading mostly recurved spines 4 mm. long; scape 3 mm. in diameter at apex, minutely pale-lepidote at the nodes; scape-bracts ovate, acuminate, the upper remote; inflorescence subsimple with a short 2-flowered branch at base, lax, covered with ferruginous stellate appressed scales but the flexuous axis soon largely glabrous; floral bracts reflexed, the lower ovate, acuminate, 11 mm. long, nearly equaling the sepals, the upper suborbicular, apiculate, about half as long as the sepals; pedicels stout, 3 mm. long; flowers spreading; sepals broadly ovate, obtuse, 8 mm. long, erose; petals to 13 mm. long, the blades broadly obovate, emarginate, ecarinate; stamens included; filaments free above the common tube with the petals; anthers narrowly triangular, nearly straight, 3 mm. long; style simple, 2 mm. long. Pl. I, fig. 16: Base of inflorescence x 1/2; fig. 17: Sepal x 1; fig. 18: Petals and stamens x 1; fig. 19: Pistil x 1.

Type in the herbarium of the Instituto Agronômico, Belo Horizonte, collected in sand of second growth, by Ponte do Santo Antonio on the Estrada de Conceição, Município of Conceição, Minas Gerais, Brazil, September 1, 1933, by H. L. Mello Barreto (No. 2122).

PITCAIRNIA RUBIGINOSA var. AMAZONICA (Baker) L. B. Smith, comb. nov.

Pitcairnia amazonica Baker, Handb. Bromel. 117. 1889.

This variety differs from var. rubiginosa only in having the

floral bracts shorter than the pedicels and the character shows transition in the following variety.

PITCAIRNIA RUBIGINOSA var. INTEGRA L. B. Smith, var. nov.

A var. rubiginosa foliis integerrimis, bracteis florigeris superioribus quam pedicellis brevioribus differt.

Type in the herbarium of the Instituto Agronômico do Norte, Belém, collected in caatinga, Tunuí, Rio Içana, State of Amazonas, Brazil, March 28, 1952, by R. L. Fróes (No. 28083).

BRAZIL: Amazonas: Cachoeira do Rio Aracá, subtributary of Rio Negro, Oct. 30, 1952, Fróes & Addison 29175 (IAN). Alto Rio Aracá, Nov. 1, 1952, Fróes & Addison 29246 (IAN).

STREPTOCALYX MURCAE L. B. Smith, sp. nov.

A S. williamsii L. B. Smith, cui affinis, bracteis primariis subintegris, bracteis florigeris amplissimis apice emarginatis et brevissime mucronulatis differt.

Leaves 7-10 dm. long, covered with appressed pale-ferruginous scales on both sides; sheaths broadly ovate or elliptic, 8 cm. long, entire except near apex; blades ligulate, acute with a thick involute-subulate apex, 45 mm. wide, narrowed toward base, laxly serrate with antrorse spines 1.5 mm. long; scape evident, about 10 cm. long; scape-bracts subfoliaceous but much reduced, very densely imbricate; inflorescence densely bipinnate, cylindrical, 12 cm. long, 5 cm. in diameter, finely ferruginous-lepidote except the petals; axis lanate-lepidote; primary bracts imbricate, suborbicular, 45 mm. long, exceeding the spikes, entire except for the microscopically serrulate apex; spikes subdensely 6-flowered; rhachis nearly straight, 3 cm. long; floral bracts suborbicular to reniform, emarginate and minutely mucronate, exceeding and almost completely enfolding the ovary, nearly imbricate, thin, entire; flowers divergent; sepals strongly asymmetric with a large lateral wing, 13 mm. long exclusive of the 3 mm. terminal mucro, connate for 2 mm.; petals 3 cm. long, naked, the blades elliptic, obtuse; ovary globose, epigynous short but distinct, placentae apical. Pl. I, fig. 20: Primary bract and spike x 1/2; fig. 21: Spike x 1/2; fig. 22: Sepal x 1; fig. 23: Petal and stamen x 1; fig. 24: Section of ovary x 2.

Type in the herbarium of the Instituto Agronômico do Norte, Belém, collected on the ground, Taraquá, Rio Uaupés, State of Amazonas, Brazil, September 9, 1947, by J. Murça Pires (No. 951).

Plate I

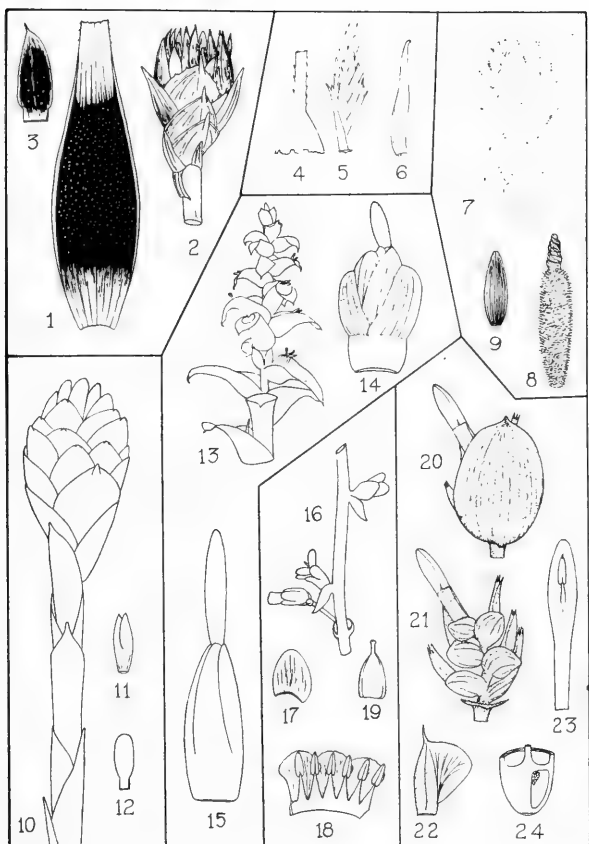


Fig. 1-3: *Greigia aristeguietae*; fig. 4-6: *Navia cardonae*; fig. 7-9: *Puya cardonae*; fig. 10-12: *Guzmania fosteriana*; fig. 13-15: *Guzmania gloriosa*; fig. 16-19: *Dyckia mello-barretoii*; fig. 20-24: *Streptocalyx murcae*.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS PSEUDOCARPIDIUM. II

Harold N. Moldenke

PSEUDOCARPIDIUM PUNGENS Britton

The type of this little-known species was collected by Nathaniel Lord Britton (no. 1992) on a hillside near Guatanamo, Oriente, Cuba, between March 19 and 31, 1909, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is known only from the type collection, which is in fruit. Britton cites N. Taylor 19 as an additional example of this species, but Taylor's plant is *P. avicennioides* (A. Rich.) Millsp., a closely related species. Three herbarium specimens, including the type, have been examined.

Citations: CUBA: Oriente: N. L. Britton 1992 (N--type, N--isotype, N--isotype).

PSEUDOCARPIDIUM RIGENS (Griseb.) Britton, Bull. Torrey Bot. Club 39: 10. 1912.

Synonymy: *Vitex rigens* Griseb., Cat. Pl. Cub. 216. 1866.

Literature: Griseb., Cat. Pl. Cub. 216--217. 1866; Jacks., Ind. Kew. 2: 1214. 1895; N. L. Britton, Bull. Torrey Bot. Club 39: 10. 1912; Prain, Ind. Kew. Suppl. 5: 209. 1921; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Prelim. Alph. List Invalid Names 52. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 99. 1942; Moldenke, Alph. List Invalid Names 55. 1942; Moldenke, Alph. List Cit. 1: 184 & 185 (1946), 3: 929 (1949), and 4: 1144. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 45 & 195. 1949; Roig, Dicc. Bot. 1: 301--302 and 2: 1115. 1953; Moldenke, Phytologia 5: 152. 1955; Alain in León & Alain, Fl. Cuba 4: 314, 316, & 545. 1957; Moldenke, Résumé 53, 388, & 468. 1959.

Shrub or low tree, to 3.5 m. tall; branches and branchlets medium-slender, not very twiggy, rather obtusely tetragonal, rather stiff, gray or whitish, glabrous; twigs brownish, slender; nodes obscurely annulate when young, not annulate in age; leaf-scars somewhat prominent and corky; principal internodes 0.3--3.8 cm. long; leaves decussate-opposite, often crowded on the young twigs and absent from the older wood, simple; petioles slender, 1--5 mm. long, glabrate, flattened and more or less canaliculate above, not noticeably ampliate at the base; leaf-blades coriaceous, rather uniformly light-green and very shiny and glossy on both surfaces, sometimes darker green above (chartaceous and nigrescent in drying when very immature), oblanceolate or narrowly obovate, varying to narrowly elliptic or oblong, 1.2--4 cm. long, 0.5--1.8 cm. wide, obtusely or bluntly subacute at the apex in outline, acute or cuneate at the base, spinulose-dentate toward and at the apex or sometimes almost to the base, rarely entire except for the spinulose apex, rarely somewhat asymmetric-

ally 1- or 2-lobed toward the apex, perfectly glabrous on both surfaces, often decidedly revolute; midrib slender, mostly impressed above, prominent beneath; secondaries very slender, 4--8 per side, spreading at almost right angles from the midrib, not arcuate, not anastomosing, usually very obscure or even indiscernible on both surfaces; vein and veinlet reticulation very fine, mostly obscure or very slightly prominent above, mostly obscure or indiscernible beneath; inflorescence axillary, paniculate, very slender and lax, 4--14.5 cm. long, 1--2 cm. wide, composed of 2--7 pairs of 1--3-flowered cymules and a terminal one, glabrous throughout; peduncles very slender, 2.5--5 cm. long, brownish; rachis similar to the peduncles in all respects but even more slender or filiform, its sympodia usually elongate; pedicels filiform, 1--3 mm. long, glabrous, brown; bracts mostly none or sometimes a few present in the lowest parts of the panicle, leaf-like but smaller, long-stipitate; bractlets numerous, one pair subtending each pair of inflorescence-branches, narrow-lanceolate or -oblanceolate, subsessile, 2--4 mm. long, about 1 mm. wide, glabrous, the uppermost ones still smaller and linear; prophylla minute, linear-setaceous, about 1 mm. long, sharply acute; corolla blue or blue-purple; fruiting-calyx somewhat incrassate, shallowly cupuliform, about 3 mm. long and 4.5 mm. wide, flaring, glabrous, its rim deeply and often irregularly 5-lobed, usually not split even under the mature fruit, scarious-margined; fruit flattened, obovate, about 5 mm. long and 7--8 mm. wide, 4-lobed with shallow rounded lobes, acute at the base, glabrous.

The type of this distinctive species was collected by Charles Wright (no. 3181) on the road to Pinal, Mayari, Cuba, on August 4 of a year between 1860 and 1864. The type collection is abundantly infested with a fungus on the branchlets, twigs, and sometimes the leaves. Shafer 3104 has the under surface of the leaves infested with another fungus. Acuffa 13331 has the leaf-blades very spiny over their whole margins.

The species inhabits thickets, rocky serpentine hillsides, and charrascales, ascending to 600 meters altitude in the Sierra Nipe. It has been collected in anthesis from April through August, and in fruit in July and December. Common names recorded for it are "chicharroncillo de costa", "chicharron de costa", and "copalillo". The last-mentioned of these names is also applied to Casearia bahamensis Urb. of the Flacourtiaceae and to Thouinia nervosa Griseb. of the Sapindaceae. In all, 39 herbarium specimens, including the type collection, and 2 mounted photographs have been examined.

Citations: CUBA: Oriente: Acuffa 13331 (Es, N), 13332 (Es, N); Carabia 3581 (Ha, N); Clemente 4957 (N); Ekman 2014 (B, N, N--photo, S, Z--photo), 6001 (S); R. A. Howard 6218 (Mu--47665, N, N); León 20388 (N); León & Alain 19277 (Ha, N), 19322 (Ha, N), 20388 (Ha, N); León & Clemente 20388 (Ha); Shafer 3104 (B, K, N, N, N, W--696247). Province undetermined: C. Wright 3181 [1860--

1864; Herb. Sauvalle 1788/1] (B—*isotype*, Bm—*isotype*, Cb—*isotype*, E—116118—*isotype*, G—*isotype*, Hv—*isotype*, Hv—*isotype*, K—*isotype*, Os—*isotype*, P—*isotype*, X—*isotype*).

PSEUDOCARPIDIUM SHAFERI Britton, Mem. Torrey Bot. Club 16: 98. 1920.

Synonymy: *Vitex shaferei* Britton ex Moldenke, Prelim. Alph. List Invalid Names 52, in syn. 1940.

Literature: N. L. Britton, Mem. Torrey Bot. Club 16: 98. 1920; Hill, Ind. Kew. Suppl. 6: 167. 1926; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Prelim. Alph. List Invalid Names 52. 1940; Moldenke, Alph. List Invalid Names 55. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 99. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 83. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 45 & 195. 1949; Moldenke, Alph. List Cit. 3: 929. 1949; Alain in León & Alain, Fl. Cuba 4: 314, 316, & 545. 1957; Moldenke, Résumé 53, 389, & 468. 1959.

Shrub or small tree, to 4 m. tall; branches and branchlets medium-stout, stiff and rigid, woody, with very small circular pith, very twiggy, light-gray, minutely puberulous, soon becoming glabrate, subterete or but slightly and obscurely tetragonal; twigs very numerous, short, decussate-opposite, densely short-pubescent or tomentulose with whitish hairs, not noticeably resinous-pulverulent, becoming glabrescent in age; nodes very obscurely annulate or not annulate; internodes on branches 0.5—2.5 cm. long, on twigs greatly abbreviated or almost obsolete; leaf-scars on twigs and branchlets corky and elevated; leaves decussate-opposite, simple, mostly crowded on only the twigs; petioles very slender, 1—3 mm. long, densely short-pubescent or tomentulose like the young twigs, not noticeably ampliate at the base, not jointed; leaf-blades coriaceous, mostly decidedly revolute, very dark-green above, whitish beneath, oblong or oblong-lanceolate, varying to narrowly elliptic, 1.5—3.7 cm. long, 4—12 mm. wide, acute and spinulose-tipped at the apex, subcuneate at the base, entire or rarely with 1 or 2 spinulose teeth along the margins, often revolute, glabrous and shiny above, densely whitish-tomentulose beneath, not resinous-pulverulent; midrib slender, deeply impressed above, very prominent beneath; secondaries very slender and short, 8—12 per side, close together, impressed or obscure above (often not discernible), prominulent beneath, spreading almost at right angles from the midrib, not arcuate, usually not ascending, conspicuously anastomosing to form a rather uniform collective vein very close to the margins beneath; vein and veinlet reticulation very fine and delicate, prominulent to the smallest divisions (under a hand-lens) above, only the larger portions prominulent beneath, the rest more or less hidden by the tomentum; inflorescence axillary, sparse, paniculate, 2—4 cm. long, 1—1.5 cm. wide, composed of 1 or 2 pairs of about 3-flowered cymes and a terminal one, rather densely puberulent with whitish hairs throughout; peduncles filiform, 1—1.7 cm. long, whitish-puberulent; rachis similar to the peduncle, its sympodia 4—7 mm. long; bracts none; bractlets linear, 2—3 mm.

long, puberulent; prophylla minute, setaceous-subulate; pedicels filiform, 1—2 mm. long, whitish-puberulent; calyx campanulate, about 2 mm. long and wide (at the apex), densely whitish-puberulent outside, glabrous within, its rim conspicuously 5-toothed with ovate-triangular, equal, sharply acute teeth or lobes; corolla blue, about 5 mm. long, puberulent; fruiting-calyx persistent, not much enlarged, patelliform, usually not split, 2—3 mm. wide, puberulent outside, glabrous within, taking with it a slight core (about 1 mm. long) upon being removed from the base of the fruit, its rim deeply 5-toothed with triangular, sharply acute, more or less uniform teeth; fruit conspicuously depressed flattened, 3—4 mm. long, 4—8 mm. wide, deeply 4-lobed, the lobes equal or at maturity 2 much larger than the others, all rounded, densely short-pubescent throughout, the base deeply umbilicate when the fruiting-calyx is removed.

The type of this species was collected by John Adolf Shafer (no. 7901) — in whose honor it is named — in coastal thickets between Sabana and Maisi, Oriente, Cuba, on December 13, 1910, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is found also on limestone rocks, ascending to 15 meters altitude. The old bark is attacked by a superficial fungus similar to the one seen on P. wrightii Millsp. It has been collected in fruit in July, in flower in December, and has been confused in herbaria with P. avicennioides (A. Rich.) Millsp. In all, 15 herbarium specimens, including the type, have been examined.

Citations: CUBA: Oriente: Acuña & Díaz Barreto 17354 (Es); Bermúdez s.n. [León 16270] (Ha, N), s.n. [León 16283] (Ha, N); León 17111 (Ha, N), 18258 (Ha, N), 18367 (Ha, N); León & Seifriz 18258 (N); Shafer 7901 (N—type, N—iso-type, N—iso-type).

PSEUDOCARPIDIUM WRIGHTII Millsp., Field Columb. Mus. Publ. Bot. 2: 182. 1906.

Synonymy: Vitex wrightii (Millsp.) Urb. ex Moldenke, Prelim. Alph. List Invalid Names 52, in syn. 1940. Vitex avicennioides Griseb. ex Alain in León & Alain, Fl. Cuba 4: 316, in syn. 1957 [not V. avicennioides A. Rich., 1850].

Literature: Millsp., Field Columb. Mus. Publ. Bot. 2: 182. 1906; Prain, Ind. Kew. Suppl. 4: 192. 1913; Britton & Millsp., Bahama Fl. 374. 1920; Moldenke, Alph. List Common Names 8. 1939; Moldenke, Geogr. Distrib. Avicenn. 4 & 6. 1939; Moldenke, Suppl. List Common Names 24. 1940; Moldenke, Prelim. Alph. List Invalid Names 52. 1940; Carabia, Chron. Bot. 6: 227. 1941; Moldenke, Alph. List Invalid Names 56. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24, 25, & 99. 1942; Moldenke, Phytologia 2: 111. 1944; Moldenke, Alph. List Cit. 1: 55, 63, 64, 74, 120, 184—188, 298, & 309 (1946) and 2: 578, 646, & 650. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 90. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 42, 45, & 195. 1949; Moldenke, Alph. List Cit. 3: 773, 868, 895, 927, 928, 930, & 943

(1949) and 4: 1127 & 1144. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 11. 1949; Roig, Dicc. Bot. 1: 427-428 & 695 and 2: 1087. 1953; Alain in León & Alain, Fl. Cuba 4: 314, 316, & 545. 1957; Moldenke, Résumé 50, 53, 54, 381, 389, 391, & 468. 1959.

Shrub or low slender or straggling tree, to 6 m. tall, often branched from the base; branches and branchlets medium-stout, rigid and stiff, gray or almost white or silvery in age, minutely puberulent, glabrescent in age, woody, with a very slender pith, obscurely tetragonal or subterete; twigs rather slender, more conspicuously tetragonal and densely short-puberulent, the puberulence flavescent or brunneous and usually interspersed with tiny resinous globules; older nodes not annulate, younger ones often more or less annulate with a slightly prominent ridge, not compressed nor ampliate; principal internodes 0.5--2.5 cm. long (or to 7.3 cm. long on vigorous shoots), very much abbreviated on twigs and younger branchlets; leaf-scars usually comparatively large and prominently elevated on the twigs and younger branchlets; leaves decussate-opposite, simple, often crowded on the young twigs; petioles very slender, not jointed, 2--7 mm. long, short-puberulent, the puberulence interspersed with tiny resinous globules, slightly ampliate at the base; leaf-blades coriaceous, very dark-green and shiny above, somewhat lighter and subnitid beneath, often more or less revolute, elliptic (rarely obovate and cuneately narrowed to the base), varying to ovate-lanceolate or orbicular, 1.5--9.3 cm. long, 0.8--5 cm. wide, varying from rounded or obtuse to subacute or rarely emarginate at the apex, broadly rounded or subcordate (varying to conspicuously cordate) at the base, usually sinuate and abundantly spinulose along the margins from the apex to almost the base with small, rather uniform, acute, and often revolute-margined teeth surmounted by a slender and sharp spine 1--1.5 mm. long (sometimes sparsely or irregularly so, rarely entire when very young), glabrous and very shiny above, glabrous or subglabrate throughout beneath or finely and sparsely puberulent (especially on the venation) and pulverulent, the puberulence interspersed with tiny resinous globules; midrib slender, usually subimpressed above, prominent beneath; secondaries 6--10 per side, spreading, irregular, slightly ascending or sometimes arcuate, slightly prominulent above, conspicuously so beneath, often anastomosing near the margins; vein and veinlet reticulation very abundant and fine, usually conspicuously prominulent above, obscure or only the larger parts prominulent (usually near the margins only); inflorescence axillary, paniculate, 4.5--16 cm. long, 2.5--6.5 cm. wide, usually composed of about 4 pairs of cymes and a terminal cymule, sometimes more abbreviated and compact, bracteolate, often bracteate at the base, densely resinous-puberulent and short-puberulent throughout, its branches very slender, divergent-ascending; peduncles 2.8--6.1 cm. long, very slender, densely short-puberulent; rachis similar to the peduncle, the sympodia 1--2.5 cm. long; pedicels filiform, 1--2 mm. long, densely puberulent; bracts usually only 1 pair, sub-

tending the lowest pair of cymes in each panicle, foliaceous, elliptic, 1—1.5 cm. long, 5—8 mm. wide, rather long-stipitate, similar to the leaves as to margin, puberulence, and venation; bractlets linear, numerous, 2—5 mm. long; prophylla minute, linear or setaceous, puberulent; corolla blue or deep-blue; fruiting calyx membranous, usually split into 2 halves on maturity of the fruit, the halves persistent, puberulent, the rim of each half conspicuously 2- or 3-toothed with broadly triangular acute teeth; fruit "greenish-yellow", flattened, broadly 4-lobed with 4 equal or subequal lobes (2 lobes often somewhat larger than the others), 3—4 mm. long, 8—9 mm. wide, densely puberulent throughout with flavescent hairs, interspersed with tiny resinous globules.

The type of this species, which is also the type of the genus, was collected by John Isaiah and Alice Bell Northrop (no. 625) along Fresh Creek, Andros island, Bahamas, on June 6, 1890, and is deposited in the herbarium of the Chicago Natural History Museum. It is named in honor of Charles Wright, whose collections have contributed so much to our knowledge of the flora of Cuba, the Dominican Republic, Mexico, Nicaragua, Texas, New Mexico, Arizona, the Bonin Islands, Australia, the Behring Sea, the Liukiu Islands, Hongkong, South Africa, and other parts of the world.

The species is said to inhabit low woods, mountain summits, limestone cliffs, dry black probably inundated loam, eruptive rock soil, woods and thickets, seroentine hills, hillsides, rocky soil, the edge of arroyos, rock outcrops, creek margins, and carrascales. It has been collected in anthesis from March to October, and in fruit in February, April, June to August, October, and November. It is usually a shrub 1 to 4 meters tall. The leaf-blades are chartaceous and nigrescent in drying when very immature. A piece of the bark of the trunk is preserved on Shafer 2467 in the Britton Herbarium. Wight reports the flowers to be "the color and odor of English violets [Viola odorata L.], a light-yellow semicircle on the large petal. Leaves with resinous odor. Bark gray, shredded". Britton & Cowell report that "the middle lobe of the lower lip much larger than the lateral ones." The old bark is abundantly attacked by a superficial fungus forming black lines. Species of Tillandsia and Dendropogon are also very often found on its branches. Combs describes it as "a low ragged tree (10 ft.), much branched, in savannahs, rare". On the stems of living plants have been found heavy infestations of what appears to be the fungus Myrangium duriaei Mont. & Berk.

Vernacular names include "chicharrón", "granadillo de costa", "granadilla de Cuba", "granadillo macho", "negracuba espinosa", and "Wright's pseudocarpidium". The first-mentioned of these names is also applied to P. multident (Urb.) Moldenke. Herbarium material of the species has been misidentified as Vitex ilicifolia Rich., V. shaferi Britton, and Ouratea sp.

B. L. Robinson says "Examination of material at hand fails to confirm the constancy of the characters cited by Dr. Millspaugh for this species" and he unites it with P. ilicifolium, and com-

bines the genus with *Vitex*. However, Robinson had no material of the fruit of *Pseudocarpidium* at hand when he made this comment. Had he seen the fruit, I am sure he would have confirmed Millspaugh's findings, as I have. In all, 154 herbarium specimens, including the type, and 5 photographs have been examined.

Citations: BAHAMAS: Brace 4933 (F—183666, F—199966, G, N, W—655508), 5329 (F—200321, N); O. Bryant 2 (F—183666, G); Northrop & Northrop 625 (A—isotype, B—isotype, B—isotype, B—photo of type, B—photo of type, C—isotype, F—181663—fragment & description of type, F—130709—type, F—photo of type, G—isotype, K—isotype, X—isotype); Small & Carter 8582 (F—283601, G, K, N, P, W—758010); A. E. Wight 261 (B, F—183672, F—225452, G, K, N). CUBA: Camagney: Acuffa & Rodriguez 16309 (Es); Britton, Britton, & Cowell 13239 (N); Roig, Luaces, & Arango 6086 (Es, Es); Shafer 561 (B, F—284468, G, N, W—659187), 2467 (F—251002, G, N, P, W—848708). Havana: Ekman 1002 (B, N, S), 1222 (B, N, N—photo, S, Z—photo), 16527 (B, S), 16895 (B, S), s.n. [León 18549] (Ha); León 5194 (Ha, N), 5215 (Ha, N), 7163 (Ha); León & Césane 8955 (N); Moldenke & Moldenke 19863 (Es, Lg, N, Sm); Roig & León 8220 (Es); Sauvalle s.n. [Guanabacoa] (N); Shafer 74 (Cm, F—181661, N), s.n. [Madruga, April 1903] (Es). Las Villas: Alain 2832 (Z); Britton, Britton, & Cowell 10200 (K); Britton, Britton, & Wilson 6067 (N, W—658790); Britton & Cowell 10200 (B, G, N, W—696115), 13291 (B, N, N—fungus, W—698425); Combs 239 (B, E—116170, F—16876, F—358042, G, Io—15691, K, Ka—61225, N); Ekman 18818 (B, S); Hodge & Howard 5027 (N); R. A. Howard 5027 (N); Howard, Briggs, Kamb, Lane, & Ritland 115 (N); J. G. Jack 5130 (A, Ha), 5818 (A, Ha), 8129 (A, B, F—719807, K, N, S); León 14940 (Ha, N). Matanzas: Acuffa 15372 (Es); Britton, Britton, & Wilson 14062 (N); León 13375 (Y). Oriente: Acuffa 17183 (Es), 17884 (Es, Es); Ekman 2329 (B, S), 4855 (S), 5923 (B, S), 7476 (S); León 15719 (Ha, N, N), 18151 (Ha, N, N); León & Alain 17965b (Ha). Pinar del Río: Acuffa & Roig 16617 (Es, N); Alain A.1673 (N); Ekman 12926 (B, S). Province undetermined: Sagra s.n. (B, F—998439); C. Wright 261 [Herb. Sauvalle 1788] (Hv, Hv), 3180 [Retiro, 1860—1864; Herb. Sauvalle 1788] (B, Bm, Cb, E—116121, G, Hv, K, Os, P, Pa, S, V, X). ISLA DE PINOS: Britton, Britton, & Wilson 15074 (F—459568, N); Ekman 12337 (B, S).

NOTES ON NEW AND NOTEWORTHY PLANTS. XXV

Harold N. Moldenke

AEGIPHILA STEYERMARKII var. *MACROPHYLLA* Moldenke, *Résumé* 70 & 441, nom. nud. 1959; var. nov.

Haec varietas a forma typica speciei foliis majoribus usque ad 18 cm. longis et 8 cm. latis recedit.

This variety differs from the typical form of the species in having much larger leaves, the petioles 1.2--2 cm. long, the blades 10--16 cm. long and 4.7--8 cm. wide.

The type of the variety was collected by Julian Alfred Steyermark (no. 74964) in a *Bonnetia* forest on the northwestern part of the summit of Abácapa-tepui, Chimantá Massif, Bolívar, Venezuela, at an altitude of 2125--2300 meters, on April 13, 1953, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. The collector describes it as a tree 30 feet tall, the leaves subcoriaceous, dark-green above, and dull paler beneath. He identified it as a species of *Citharexylum*.

ERIOCAULON STELLULATUM var. *LAOSENSE* Moldenke, var. nov.

Haec varietas a forma typica speciei recedit foliis brevioribus fenestratis, pedunculis bisulcatis brevioribus glabris, et vaginis fenestratis.

This variety differs from the typical form of the species very notably in its shorter leaves, which are only 1 cm. long and 1 mm. wide and are very plainly fenestrate, its peduncles being only 2-sulcate and 2-costate, glabrous throughout, and only 3.5--8 cm. long, and the sheaths being very thin-membranous and plainly fenestrate.

The type of this variety was collected by Eugène Poilane (no. 28225 bis) at Sêbangphay, in the province of Savannakhet, Laos, Indochina, on October 21, 1938, and is deposited in the herbarium of the Montreal Botanical Garden in Montreal, Quebec.

PAEPALANTHUS BRADEI Moldenke, sp. nov.

Herba perennis caulescens; caulibus elongatis tenuibus dense foliosis; foliis graminoides membranaceis 16--20 cm. longis, medio 8--9 mm. latis, attenuatis utrinque glabris; pedunculis numerosis 15--23 cm. longis tenuissimis 3-costatis glabris stramineis; capitibus simplicibus hemisphaericis brunneis ca. 7 mm. latis.

Perennial caulescent herb; stem conspicuous, slender, about 9 cm. long and 7 mm. wide, plainly many-annulate, apparently glabrous; leaves very numerous, the lower ones deciduous, leaving conspicuous annulations on the stem, bright-green on both surfaces, not shiny, grass-like, thin-membranous, 16--20 cm. long, 8--9 mm. wide at the middle, gradually attenuate to the sharply acute apex, glabrous on both surfaces, many-nerved, but the ner-

ves mostly indiscernible on both surfaces, not at all fenestrate; peduncles numerous, about 23 per plant, equaling or slightly surpassing the leaves, very slender, stramineous, 15--23 cm. long, rather indistinctly 3-costate, glabrous throughout; sheath closely appressed, 4--5 cm. long, oblique at the apex, not plainly striate, not twisted, glabrous; heads simple, hemispheric, brownish, about 7 mm. wide; involucre bractlets dark-brown, triangular-ovate, about 1.8 mm. long and wide, with somewhat convex sides, acute at the apex, densely short-ciliate on the margins, otherwise glabrous; receptacle long-pilose; receptacular bractlets broadly spatulate, brown, about 2 mm. long and 1.6 mm. wide, rounded-truncate at the apex, densely white-barbate-ciliate at the apex; staminate florets: sepals 3, brown, oblanceolate, about 1.6 mm. long and 0.5 mm. wide, subacute and densely white-barbelate at the apex; petals 3, connate into a slender stramineous tube about 1.3 mm. long, glabrous; stamens 3; pistillate florets not seen.

The type of this species was collected by J. Santos Lima and Alexandre Curt Brade (no. 14198) in "aquas paradas" at Santa Maria Magdalena, at an altitude of 900 meters, Rio de Janeiro, Brazil, on March 5, 1935; it is no. 25419 in the herbarium of the Jardim Botânico at Rio de Janeiro and is deposited in the herbarium of the Botanisches Museum at Berlin.

PAEPALANTHUS DENNISI Moldenke

My good friend, N. Y. Sandwith, has kindly pointed out to me that an obvious error occurs in the original write-up of this species in *Phytologia* 7: 88--89 (1959). The type specimen is actually deposited in the herbarium of the Royal Botanic Gardens at Kew, England.

PAEPALANTHUS YUCCA Ruhl., sp. nov.

Herba perennis caulescens; caulibus elongatis dense foliosis; foliis yucciformibus ca. 15 cm. longis, medio 1 cm. latis, utrinque glabris nitidisque acutissimis; pedunculis paucis ca. 45 cm. longis stramineis glabris; capitibus multicapitulatis subglobosis ca. 1 cm. latis albidis.

Perennial herb, conspicuously caulescent; stem about 15 cm. long and 7 mm. wide, plainly many-annulate, brownish, sparsely pilose, more densely so on the upper face of each annulation with whitish appressed hairs, densely foliose, the leaves borne in *Yucca*-like fashion; leaves numerous, the lower ones deciduous, leaving transverse annulations on the stem, lanceolate, glistening-shiny on both surfaces, 12--15 cm. long, about 1 cm. wide at the middle, glabrous on both surfaces, gradually attenuate to the very acute apex, multi-striate with very slender and inconspicuous veins, the cross-venation visible only under a hand-lens; peduncles apparently few, about 3 per plant, borne at or near the apex of the stem, erect, about 45 cm. long, many-costate with rather inconspicuous ribs, dark-stramineous, very shiny, completely glabrous toward the base, but increasingly whitish-

pilose toward the apex, the hairs somewhat spreading; sheath rather narrow, about 10 cm. long, glabrous, not striate, not twisted, truncate at the apex; heads subglobose, about 1 cm. wide, whitish, composed of about 25 headlets; involucre bractlets elliptic, brown, about 1.6 mm. long and 1 mm. wide, long-pilose at and near the apex with club-shaped, granulose, gray hairs; receptacle pilose; receptacular bractlets linear-oblong, dark-brown, about 1.7 mm. long and 0.4 mm. wide, acute and densely barbate at the apex; staminate florets: sepals 3, elliptic, dark-brown, about 1 mm. long and 0.4 mm. wide, abruptly acute and barbellate at the apex, 1-nerved, united at the base; petals 3, light-flavoids; anthers whitish or yellowish to brownish; pistillate florets: sepals 3, dark-brown, elliptic, about 1.7 mm. long and 0.7 mm. wide, acute and barbellate at the apex, less distinctly nerved, united at the base; petals light-brown, obovate, about 1.5 mm. long and 0.7 mm. wide, abruptly acuminate and barbellate at the apex; pistil 3-carpellary; ovary subglobose, glabrous, 3-sulcate, 3-celled; stigmas 3, club-shaped, papillose; style-appendages much elongate, each bilobed with 2 long-filiform branches.

The type of this distinctive species was collected by George Gardner (no. 5269) in Minas Gerais, Brazil, in 1842, and is deposited in the herbarium of the Botanisches Museum at Berlin. Ruhland apparently studied this plant carefully, made elaborate notes about it, and named it, but failed to validate the name by formal publication. It is therefore published in his behalf here.

SYNGONANTHUS ALLENI var. *BRASILIENSIS* Moldenke, var. nov.

Haec varietas a forma typica speciei recedit pedunculis unifornibus numerosissimis ca. 1 cm. longis et caulibus 2.5--3.5 cm. longis.

This variety differs from the typical form of the species in having its stems only 2.5--3.5 cm. long, issuing from a dense mass of glistening-white hair, and the peduncles only about 1 cm. long and all very uniform in length so as to cause the heads to form a very dense hemispheric mass.

The type of this handsome variety was collected by Walter Alberto Egler (no. 968) and Raimondo da Missão Velha on the Rio Cururú, Alto Tapajós, Pará, Brazil, on July 19, 1959; it is no. 23628 in the herbarium of the Museo Goeldi at Belém and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

SYNGONANTHUS EGLERI Moldenke, sp. nov.

Herba perennis caulescens; caulibus gracilibus nudis complantatis pilosulis, ad apicem umbellis foliorum pedunculorum portandis; pedunculis numerosissimis stramineis 15--45 cm. longis minute pilosulis; capitibus hemisphaericis argenteis.

Perennial caulescent herb; basal leaves few, grass-like, thin-membranous, 17--25 cm. long, 8--11 mm. wide at the middle, glabrous on both surfaces, soon disappearing; stem slender, stiff, 4--6 cm. long, leafless, flattened, rather densely whitish-strigillose, bearing a large whorl of leaves and peduncles at

its apex; stem-leaves numerous, membranous, grass-like, irregular in size, 2.5–9 cm. long, 3–5 mm. wide, glabrous and very shiny on both surfaces, attenuate-acute at the apex; peduncles very numerous, about 25 per whorl, erect, stramineous, many-striate, 15–45 cm. long, minutely pilosulous, glabrescent in age; sheaths rather loose, 5–6 cm. long, not plainly striate, not twisted, pilosulous throughout, oblique at the apex, the blade erect and sharply acute; heads hemispheric, silvery-white; involucrel bractlets whitish, narrowly oblanceolate, about 3.1 mm. long and 1 mm. wide, sharply acute at the apex, glabrous and shiny; receptacle long-pilose; receptacular bractlets narrowly oblong or lanceolate, about 1.6 mm. long and 0.1 mm. wide, sharply attenuate-acute at the apex, long-ciliate along the margins, especially above the middle; staminate florets: sepals 3, whitish, connate only at the base, broadly elliptic, about 2.6 mm. long and 0.6 mm. wide, long-acuminate at the apex and narrowed to the base, long-pilose at the base, otherwise glabrous; petals 3, connate into an infundibular whitish tube about 2 mm. long; pistillate florets: sepals 3, separate, narrowly elliptic, whitish, about 2.5 mm. long and 0.3 mm. wide, attenuate-acute at the apex, long-pilose at the base, otherwise glabrous; petals 3, connate at the middle, white, spatulate, about 1.6 mm. long and 0.5 mm. wide, obtuse at the apex, long-pilose at the base, otherwise glabrous; style short, stramineous, about 0.3 mm. long, glabrous; ovary globose, stramineous, about 0.8 mm. long and wide, glabrous, 3-sulcate, 3-celled, 3-ovulate.

The type of this species was collected by Walter Alberto Egler (no. 818) and Raimundo on a campo at Missão Nove, on the Rio Cururú, Alto Tapajós, Pará, Brazil, on July 12, 1959; it is no. 23634 in the herbarium of the Museo Goeldi at Belém and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

PAEPALANTHUS ARISTATUS Moldenke, sp. nov.

Herba perennis parva caulescens; caulibus 2–6 cm. longis dense foliosis; foliis linearibus subrigidis usque ad 1 cm. longis, ad basin valde ampliatis et ciliolatis ceterim glabris; pedunculis solitariis 1–2 cm. longis dense puberulis; capitibus hemisphaericis albis 4–5 mm. latis.

Small perennial caulescent herb, forming dense tufts; stems simple or few-furcate, 2–6 cm. long, densely foliose, erect; leaves linear except for the widely ampliate base, rather firmly rigid, ascending, 5–10 mm. long, about 0.5 mm. wide, blunt at the apex, glabrous except for the ciliolate widened base; peduncles solitary, one per branch near its apex, 1–2 cm. long, not plainly costate or striate, densely puberulent throughout; sheaths closely appressed, 8–10 mm. long, puberulent throughout, oblique at the apex, the blade lanceolate, long-acuminate, ciliolate; heads hemispheric, white, 4–5 mm. wide; outer involucrel bractlets pale-stramineous, elliptic, about 2.3 mm. long and 0.8 mm. wide, aristate-acuminate for about 0.8 mm. of its length, glabrous, the inner ones similar in all respects but somewhat oblanceolate and about 1 mm. wide; receptacle long-pilose; recep-

tacular bractlets pale-stramineous, obovate, about 2 mm. long and 1 mm. wide, long-acuminate at the apex, long-ciliate from the widest part to the apex, otherwise glabrous; staminate florets: sepals 3, pale-stramineous, spatulate, about 1.1 mm. long and 0.3 mm. wide, densely pilose on the back and long-barbate at the rounded apex, united only at the base; petals 3, connate into a stramineous tube about 1.6 mm. long, the free portion short and erect; stamens 3; pistillate florets: sepals 3, white, separate to the base, oblong, about 1.6 mm. long and 0.3 mm. wide, densely white-barbate at the apex, otherwise glabrous; petals 3, exactly similar to the sepals, separate to the base; style stramineous, about 1 mm. long, glabrous; ovary subglobose, stramineous, about 0.6 mm. long and wide, 3-sulcate, 3-celled, 3-ovulate.

The type of this species was collected by John J. Wurdack and L. S. Adderley (no. 42861), who say that the plant was locally abundant in the Sabana Caname, on the left bank of the Cano Caname, Río Atabapo, below Guarinumó, at an elevation of 125 meters, Amazonas, Venezuela, on June 8, 1959, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has very great habital resemblance to Syngonanthus savannarum Moldenke, but may be distinguished at once superficially by its aristate involuclral bractlets.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS AVICENNIA. I

Harold N. Moldenke

This is the twenty-second in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated have all been verbenaceous: Aegiphila Jacq., Amasonia L. f., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L. The present work is my first in the Avicenniaceae, and, since the family is monogeneric, completes the family.

Full explanation of the abbreviations employed herein for the names of the 254 herbaria whose material was examined in the preparation of this work will be found in Phytologia 5: 154—159 (1955) and 6: 242 (1958) with the following additions:

Bd = Herbarium Bradeanum, Rio de Janeiro, Brazil

Bs = Basler Botanische Gesellschaft, Basel, Switzerland

Gl = Museu Goeldi, Belém, Pará, Brazil

Mm = McGill University, Montreal, Quebec, Canada
 Ng = Department of Forests, Lae, New Guinea
 Um = University of Montreal, Montreal, Quebec, Canada
 Wp = University of Manitoba, Winnipeg, Manitoba, Canada

AVICENNIACEAE Endl. ex Schnitzlein, Icon. Fam. Nat. Reg. Veg. 2: [215--216], pl. 137**. 1856.

Synonymy: Avicennieae Endl., Gen. Pl. 632, 638, & 639 (1838) and 1401. 1841. Avicennioideae Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4, 3a: 181. 1894. Avicenniaceae Van Tiegh., Journ. de Bot. 12: 345--359. 1898. Avicenniaceae Small, Fl. Miami 150 & 161. 1913. Avicennaceae Woodward, Journ. N. Y. Bot. Gard. 39: 118, sphalm. 1938. Avicenniaceae Schnitzlein apud Bullock, Taxon 7: 7. 1958. Avinneniaceae Espinosa ex Moldenke, Résumé 236, in syn. 1959.

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Shrubs or trees of maritime regions, mostly inhabiting the saline or brackish coastal mangrove lagoons, with pneumatophores; growth in diameter of trunks and stems brought about by concentric layers of mestome rings; branches, branchlets, and twigs commonly terete, prominently nodose, and articulate; leaves decussate-opposite, thick-textured, persistent, petiolate, exstipulate, the blades entire; inflorescence axillary or terminal, determinate and centrifugal (cymose), spicate or subcapitate, the axillary inflorescences mostly paired; flowers sessile, perfect, hypogynous, small; calyx composed of 5 nearly separate sepals, the segments ovate and plainly imbricate, unchanged in fruit, subtended by a pseudo-involucre composed of a scale-like bractlet and 2 alternate scale-like prophylla, which are slightly shorter than the calyx and are imbricate with each other and with the calyx-segments; corolla actinomorphic, gamopetalous at the base, campanulate-rotate, 4-parted; stamens 4, inserted in the throat of the corolla-tube, equal or subdidynamous; gynoec-

ium composed of 2 united carpels; ovary compound, but with a free central often more or less 4-winged placenta; ovules 4, pendent, orthotropous, hanging from the tip of the central columella; fruit a compressed oblique capsule, with a juicy and somewhat fleshy usually tomentellous exocarp, dehiscent by 2 valves, by abortion regularly only 1-seeded; seeds without a testa; embryo viviparous; radicle hairy; cotyledons 2, folded lengthwise.

The Black-mangrove Family comprises only a single genus, Avicennia, with 16 known living species and varieties, inhabiting the maritime regions of the tropics and subtropics of both the Old and New Worlds. It is one of the chief constituents of almost all coastal mangrove lagoons. Four fossil species are known — 2 from the United States and 2 from Colombia. A modern species is almost known in the fossil form from Trinidad.

This family is often considered to be merely a tribe (Bentham) or a subfamily (Briquet) of the Verbenaceae, from whose tribes Viticeae or Teijsmanniodendreae it is usually regarded as having arisen, although some morphologists regard it as having arisen from the Dipterocarpaceae or Ancistrocladaceae. Its worthiness of being raised to family rank was pointed out by Sain-Hilaire in his Pl. Usuel. Bras. 1—4, pl. 40 (1826), by Endlicher in his Gen. Pl. 1: 394 & 638—639 (1838), by Schnitzlein in his Icon. Fam. Nat. Reg. Veg. 2: [215—216], pl. 137** (1856), by Bocquillon in his Révue du Groupe des Verbénacées in Adansonia 3: 181 (1862), by Eichler in his Blüthendiagramme 1: 231 (1875), by Van Tieghem in Journ. de Bot. 12: 199 & 345—365 (1898), by Warming in his Frøplanterne 396—404 (1912), and by Small in his Fl. Miami 150 & 161 (1913), Shrubs Fla. 110, 117, & 118 (1913), Fla. Trees 93 & 95 (1913), Fl. Fla. Keys 119 & 130 (1913), and Man. Southeast. Fl. 1079, 1144, & 1145 (1933). The researches of wood anatomists, like Record & Mell [Timbers Trop. Am. 528—529. 1924], and Panshin, morphologists, like Croizat, and pollen analysts, like Erdtman [Svensk Bot. Tidsk. 39: 284. 1945], all point to the same conclusion. Miquel in Lehmann, Pl. Preiss. 1: 353 (1845) regarded it as a family coordinate with the Verbenaceae, but which he designated as "Avicennieae Endl.", while Frey-Wyssling, Stoffaus. HbH. Pfl. 233 (1935) also regarded it as a family ("Avicenniaceen") distinct from the "Verbenaceen". The family has been accepted, among others, by Buswell [Native Trees & Palms S. Fla. 38 & 45. 1945], by Alain [Contrib. Ocas. Mus. Hist. Nat. Coleg. La Salle 7: 79. 1946], by Hodge & Gutiérrez Villegas [Revist. Fac. Nac. Agron. Medellin 8: 415 & 426], by Karkley [Revist. Fac. Nac. Agron. Medellin 8: 176. 1948; 9: 46, 169, & 177. 1949], and by Den Berger [Determinat. Houts. Mal. Fam. 20 & 72. 1949]. It has been accepted by me in all of my publications dealing with members of this group from 1930 to the present. The late Dr. A. Pulle, in a letter to me dated October 2, 1937, says "I think it wise to adopt your division of the former Verbenaceae into Avicenniaceae and Verbenaceae s. str." Bullock [Taxon 8: 160. 1959] proposes Avicenniaceae for conservation, but credits it to Endlicher's "Ench. Bot. 314.

1841", where the name is actually spelled "Avicennieae". Bullock designates the type genus and species of the family as Avicennia L. and A. officinalis L.

August Saint-Hilaire in Mém. Mus. Hist. Nat. Paris 4: 398 (1818) says "MM. de Jussieu (Gen.) et Brown (Gen. rem.), ont placé l'avicenia parmi les verbenacées. It existe certainement de très-grandes différences entre ces plantes." In his Pl. Usuel. Bras., in 1826, under Verbena pseudogervae, he gives a discussion of the relation of the Verbenaceae and Lamiaceae and states that he is convinced that Avicennia does not belong in the Verbenaceae.

Eichler, in his Blüthendiagramme 1: 231 (1875), says "Avicennia bekannt als 'lebendiggebärend', d. i. bereits keimend, während die Frucht noch am Baum hängt.....soll sich von den Verbenaceen auch durch eine anfangs freie Central-Placenta unterscheiden. Sie bildet daher vielleicht besser den Typus einer eigenen Familie, wie von Endlicher bereits vorgeschlagen wurde; dieselbe würde sich zu den Verbenaceae etwa verhalten, wie die Lentibulariaceen zu den Scrophulariaceae." Record & Hess, in their "Timbers of the New World", pages 72--73 (1943) definitely accept the family Avicenniaceae, based on their study of its wood anatomy. Erdtman, in Svensk Bot. Tidsk. 39: 282 & 284 (1945), says "Avicenniaceae. A few words ought finally to be said about Avicennia. Arguments have recently been put forward for its being referred to Labiatae (Junell, l.c.). So much, however, does Avicennia deviate from the true Labiatae stock, pollermorphologically (cf. fig. 2), as well as in other respects, that it probably should be regarded as forming a family of its own."

In previous publications I gave the year "1843" as the date for the Schnitzlein publication cited above, by Bullock has pointed out in a letter to me dated May 20, 1959, that these pages were included in Heft XI which was reviewed in Bot. Zeit. 14: 863 on December 5, 1856, while Heft X was reviewed in the same work, vol. 13, p. 758, in 1855. The assumption, therefore, is that "1856" is the correct date of publication.

The true Verbenaceae are not lagoon plants and only very seldom are they found in mangrove swamps. They are herbaceous or woody, with normal trunk- and stem-growth without concentric layers of mestome-rings; branches, branchlets, and twigs commonly tetragonal and not articulate; the individual flowers usually not plainly involucrate; calyx mostly very plainly gamosepalous; corolla mostly very plainly gamopetalous, tubular to infundibular or hypocrateriform, often 2-lipped; the ovary more or less completely 2--5-celled, never with a free central placenta or columella; the ovules mostly basal or lateral and anatropous or hemi-anatropous; fruit mostly schizocarpous or drupaceous and with 2--4 pyrenes, the seeds testate, the embryo never viviparous, the radicle glabrous, and the cotyledons are parallel, not folded.

Adrian S. Foster, in a letter to me dated January 4, 1954, says "According to the fairly detailed description which you will find in Metcalfe and Chalke's 'Anatomy of the Dicotyledons', page

1038, Avicennia is distinguished by the fact that successive rings of bundles rather than a continuous cylinder of phloem and xylem occur in the stem. This means, in simplest language, that a succession of cambia arise in a centrifugal direction, each cambium giving rise to a separate cylinder of bundles. This distinctly is anomalous growth and might serve to illustrate clearly what Van Tieghem had in mind in his original description."

Leon Croizat, in letters to me dated June 25 and July 1, 1944, says "Avicennia is perfectly placed as the type of a new family of its own, and with the Verbenaceae it has in common but the superficialities of habit. Your family answers the basic 4-carpellary, 1-ovulate type of placentation that goes back to the oleaceous and cornaceous plexus, and finds in Convolvulus, certain Acanthaceae and the Borraginaceae its latest expression. Avicennia, on the contrary, is a degenerate member of the Rhizophora-Dipterocarpus affinity, that is, a TRUE MANGROVE. Here come also the Punicaceae and the Cactaceae, by the way. In Sonneratia you have definitely opposite leaves, as you have in Avicennia..... A strange thing is the enormous importance of the plants of the mangrove in evolution. Some of the most vital nodes of classification begin at the seashore, which is just as true of Avicennia as it is of Cactus and Celastrus. It seems that after you have followed a line of evolution (of which there are but few, not more than five in the whole of flowering plants, all traceable to some basic structure) you hit, sooner or later, the mangrove. In other words (and this is not strange): when lands emerged, they were colonized at first by the plants of the strands. This is but what one would expect, and, strange to say, it comes out true in precise phylogeny and systematic. I did not know of this, so I did not force my conclusions to reach it. It just happened. Sharp lines begin at the mangrove limit, as when plants of the very same genus have exceedingly different seeds, those of the Hypericaceae and those of the Euphorbiaceae, for instance, with very similar floral structures. Avicennia and Ancistrocladus are monotypes in this group, and their morphology is in no sense more obscure than that of the Sonneratiaceae and the Lecythidaceae, or their raison d'être more involved than that of the Dipterocarpaceae. The peculiarities of the ovule of Viscum match those of the ovule of Avicennia and Rhizophora..... Thus, the Avicennia plant is ABSOLUTELY! not of your family, but a strange child of the Dipterocarpaceae and the Ancistrocladaceae (which are most likely to be regarded as one family). Opposite leaves do not make it a verbenaceous plant, for such leaves occur in the Sonneratiaceae. The perianth is of a reduced type, but the disc still can be traced."

Van Tieghem in Journ. de Bot. 12: 345—365 (1898) gives a very detailed discussion of the Avicenniaceae in comparison to the Verbenaceae. He concludes "On voudrait montrer ici d'abord qu'il est nécessaire de la retirer des Verbénacées pour en faire

une famille autonome, les Avicenniacees, ensuite que cette nouvelle famille doit être rangée dans la sous-classe des Inséminées et dans l'ordre des Innucellées, c'est-à-dire très loin des Verbenacées, qui appartiennent, comme on sait, à la sous-classe des Séminées et à l'ordre des Ténuinucellées.....De tout ce qui précède il résulte que, par la structure de la tige, de la feuille et de la racine mais surtout par celle du pistil et du fruit, les Avicennies diffèrent des Verbenacées trop profondément pour qu'il soit possible de les conserver désormais dans cette famille. Le premier auteur qui les y a placées ne l'a fait d'ailleurs qu'avec doute. 'An genus verè verbenaceum?' se demandait déjà à leur sujet A.-L. de Jussieu [1806]. Plus tard, A. de Saint-Hilaire a reconnu qu'il existe certainement de très grandes différences entre les Avicennies et les Verbenacées' [1818] et Endlicher ne les a classées que dans le voisinage de cette famille [1840]. Plus tard encore Bocquillon, sans s'expliquer autrement sur ce point, les a exclues de ce groupe [1863]. Tous les botanistes qui ont suivi n'en ont pas moins continué à les y maintenir. Il est même à remarquer que le dernier en date, M. Briquet, après avoir pourtent résumé les observations de M. Treub sur ces plantes, déclare qu'il ne subsiste aucun doute qu'elles n'appartiennent réellement à la famille des Verbenacées.

"Il faut, au contraire, croyons-nous, les en séparer fortement et les considérer comme les types d'une famille bien distincte, les Avicenniacees.....

"Par tout les caractères qui l'éloignent des Verbenacées, notamment par la structure du pistil et du fruit, la famille ainsi constituée se rapproche des Santalacées et des autres familles qui se groupent autour d'elles pour former, comme on sait, dans la sous-classe des Climacorhizes inséminées, l'ordre des Innucellées or Santalinées....Le fruit, en effet, y est dépourvu de graines: ce sont donc des Inséminées. L'ovule y est réduit au lobe ovulaire, sans différenciation de nucelle: ce sont donc des Innucellées. En outre, la placentation y est centrale et un seul des ovules s'y développe, comme chez toutes les autres Innucellées: de plus, l'ovaire y est pluriloculaire dans sa région inférieure, comme chez la plupart des plantes de cet ordre.

"D'un autre côté, par la structure secondaire si remarquable de la tige par la dualité des ovules dans chaque carpelle, par l'existence et le mode de croissance de la cellule cotyloide, par l'embryon dressé et par l'absence d'albumen, les Avicenniacees diffèrent de toute les autres Innucellées et prennent dans cet ordre une place à part. Laquelle?

"Dans sa constitution actuelle, l'ordre des Santalinées comprend, on le sait, trois alliances: les familles où la fleur est depourvue de corolle et qui sont vertes forment l'alliance des Santales, celles où la fleur est apétalé et qui sont depourvues de chlorophylle f'alliance des Sarcophytales, celles où la fleur est petalé l'alliance des Olacales. Chez les Olacales, la

corolle est presque dialypétale: mais on y trouve cependant une petite famille, les Harmandiacées, ou elle est gamopétale. Les Avicenniacees ayant une corolle gamopétale, c'est près des Harmandiacées qu'elles viennent se placer, prenant ainsi la tête de l'ordre tout entier.

"Des lors, puisque les Harmandiacées ne sont plus seules à posséder ce caractère, il devient nécessaire de distinguer, dans l'ordre des Santalinées une quatrième alliance, caractérisée par la gamopétalie, alliance qui comprendra des Harmandiacées et les Avicenniacees, et qu'on pourra nommer les Avicenniales. Cette alliance nouvelle correspond à celle des Elytranthales dans l'ordre des Inuvulées or Loranthinées. Les Avicenniacees s'y distinguent des Harmandiacées notamment par la structure de la tige et de la feuille, par la corolle et l'androcée hétéromères, par les étamines alternipétales, à quatre sacs polliniques s'ouvrant en long, par l'absence de disque nectarifère, par la dualité des ovules dans chaque carpelle, par l'embryon dressé et par l'absence d'albumen."

The family Avicenniaceae may be distinguished from the families with which it has so often hitherto been united by means of the following key:

1. Placenta central, free; ovules apically attached, pendulous, orthotropous.
2. Ovary incompletely 4-celled; cotyledons folded; typically saline lagoon shrubs or trees; growth in diameter of trunks and stems brought about by concentric layers of mestome rings; branches, branchlets, and twigs commonly terete, prominently nodose and articulate.
Family Avicenniaceae Endl.
- 2a. Ovary 2-celled to the middle; cotyledons not folded; typically woody vines of non-saline situations; trunk and stem-growth normal; branches, branchlets, and twigs commonly more or less tetragonal and not articulate.
Family Symphoremaceae Moldenke.
- 1a. Placentae axial; carpels 2 or 4, each bearing 2 ovules, but one carpel often more or less aborted, the carpel-edges turning back from the middle of the ovary to the midrib of each carpel, making false-partitions; ovules basally or laterally attached, anatropous or hemi-anatropous, apotropous.
3. Seeds with endosperm. Family Stilbaceae Lindl.
- 3a. Seeds without endosperm. Family Verbenaceae J. St.-Hil.

In connection with the emphasis laid on the characteristics of the wood anatomy of this group in contradistinction to those of other groups, it is interesting to note that F. B. H. Brown in Bishop Mus. Bull. 130: 352 (1935) advocates the validity of Campylothea as a genus, and points out the systematic importance of characters such as the arboreous habit, differences in the anatomy of the stem, the eventual occurrence of ducts containing ethereal oils or resin, and the nectar gland.

AVICENNIA L., Sp. Pl. ed. 1, 110. 1753; Gen. Pl., ed. 5, 49. 1754.

Synonymy: Bontia L. ex Loefl., Iter Hisp. 193. 1758. Donatia Loefl., Iter Hisp. 193, in syn. 1758. Upata Rheede ex Adans., Fam. Pl. 2: 12 & 201. 1763. Oepata Rheede ex Adans., Fam. Pl. 2: 201, in syn. 1763. Sceura Forsk., Fl. Aegypt.-arab. 37. 1775. Racka Bruce ex J. F. Gmel., Syst. Veg. 245, in syn. 1791; Wittstein, Etymol.-botan. Handwörterb. 749. 1852. Halodendrum Thou., Gen. Nov. Madagas. 8. 1806. Halodendron Roem. & Schult., Syst. Veg. 3: 485. 1818. Upata Adans. ex Schau. in Mart., Fl. Bras. 9: 302, in syn. 1851. Halodendron Thou. ex Schau. in Mart., Fl. Bras. 9: 306, in syn. 1851. Avicenia Griff., Notul. Pl. Asiat. 4: 173, sphalm. 1854. Racka J. F. Gmel. ex Jacks., Ind. Kew. 2: 679. 1895. Hilairanthus Van Tiegh., Journ. de Bot. 12: 357--358. 1898. Avicennea L. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940. Auicennia Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 55, in syn. 1940. Avecinnia L. ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Avicenna L. ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Avixennia L. ex Moldenke, Alph. List Cit. 1: 285, sphalm. 1946. Avincennia Es-pinosa ex Moldenke, Résumé 236, in syn. 1959. Avicenuia L., in herb. Saltzmannia Roxb., in herb.

Literature: see under Avicenniaceae.

Glabrous or canescens shrubs or trees of maritime regions, mostly inhabiting the saline or brackish coastal mangrove lagoons, with wide-creeping roots and numerous erect pneumatophores; growth in diameter of trunks and stems brought about by concentric layers of mestome rings; branches, branchlets, and twigs commonly terete, prominently nodose, and articulate; leaves decussate-opposite, petiolate, exstipulate, persistent, variable, the blades coriaceous, entire, net-veined, glabrous or densely furfuraceous or tomentellous beneath; inflorescence axillary or terminal, determinate and centrifugal (cymose), spicate or subcapitate; cymes contracted, often capituliform, pedunculate, usually paired in the axils of the upper leaves or arranged in a short thyrses or trichotomous corymb at the apex of the branchlet; flowers small, sessile, perfect, hypogynous; calyx coriaceous, cupuliform, gamopetalous, short, deeply 5-partite, often sericeous, unchanged and not accrescent in the fruiting stage, the sepals nearly separate, the lobes varying from oblong to ovate or broadly ovate, plainly imbricate, usually rounded or obtuse at the apex, persistent, subtended by a pseudo-involucre composed of a scale-like bractlet ("bract") and two alternate scale-like prophylla ("bracteoles") which are slightly shorter than the calyx and are imbricate with each other and with the calyx-lobes; corolla gamopetalous at the base, actinomorphic, campanulate or campanulate-rotate, varying from white or whitish to yellow, its tube short, wide, cylindrical or infundibular, straight, the limb spreading, usually 4-parted, rarely 5-parted, the lobes subequal or the posterior one a little broader, usually obovate-oblong and rounded at the

apex; stamens 4, inserted in the throat of the corolla-tube, equal or subdidynamous; filaments short or very short, filiform; anthers ovoid, scarcely exerted, with parallel thecae; gynoeceum composed of 2 united carpels; style short, bifid or bilobate, the lobes stigmatiferous at the apex; ovary superior, sessile, compound but with a free central often more or less 4-winged placenta, imperfectly 4-celled ["1-celled" according to Standley]; ovules 4, pendent, orthotropous, hanging from the tip of the central columella, one in each imperfect cell [Baker says the ovary is "2-celled; ovules 2 in a cell, collateral"]; fruit a compressed, ovoid, oblique capsule, rarely symmetric, often mucronate or apiculate at the apex, with a dry or somewhat fleshy usually tomentellous or furfuraceous exocarp, dehiscent by 2 thickened valves ["coriaceous, indehiscent" according to Baker], by abortion regularly only 1-seeded; seeds without testa; embryo viviparous, naked because of the arrested development of the ovule integuments; radicle hairy, inferior, the plumula commencing to grow before the fruit falls; cotyledons 2, folded lengthwise, large.

The genus is named in honor of Abū Alī Husain Ibn Abd Allāh [Abu Ali Alhosiān Ben Sina] (980—1037), better known as "Ibn Sina" or "Avicenna", famous Persian physician, mathematician, philosopher, and naturalist, who probably lived at Bokhara. The type species of the genus is A. officinalis L.

Authors have misinterpreted many of the characters of this genus in the past. The ovary is said to be 1-celled by Standley, 2-celled by Baker, and 4-celled by other authors. The pendent orthotropous ovules are described as "collateral" by Baker, who also describes the fruit as "coriaceous" and "indehiscent". Many writers describe the stigma as sessile and bifid, while others say that there is a bifid style. Stilt-roots have been recorded by several collectors, especially for A. officinalis, but it is not certain to me that these reports are not the result of confusion with species of Rhizophora, since the two genera so uniformly grow together and stilt-roots are so characteristic of the latter genus.

Pearson and Briquet, following Schimper, recognized only 3 species in the genus. Baker, Watt, and Benthām recognized "3 or 4 species". Today we recognize 15 species and 5 varieties.

Avicennia L. is given as a valid genus in the Labiatae [Lamiaceae], section Verbeneae, by H. G. L. Reichenbach, Conspect. Reg. Veg. 1: 117 (1828) with two subgenera, Avicennia and Halodendron. Adanson, in his Fam. Pl. 2: 201 (1763), reduced Avicennia to synonymy under Upata Rheede. The synonyms Bontia L. and Racka Bruce, cited above, are referred to the family Myoporaceae -- the former by Gerth van Wijk in his Dict. Plantnames (1911), the latter by Wittstein in his Etymol.-botan. Handwörterb. 749 (1852).

Common names for members of the genus as a whole include "avicenne" (Lamarck), "avicennée" (Necker), "Avicennie" (Willdenow), "black mangroves" (Small), "blackmangroves" (Harrar),

"Lebendiggebärend" (Eichler), "mangroves", and "Salzbaum".

That individuals of this genus sometimes attain large size is attested by David Fairchild's statement in his "Garden Islands of the Great East", p. 77 (1943): "Mrs. Archbold wandered out under an immense Avicennia tree [along the Krai Krai River on Biliran Island]".

Miss Green, in Kew Bull. 1935: 509 (1935), says that Ewart & Davies in their Fl. N. Terr. 239 (1917) reduce Tatea F. Muell. to synonymy under Avicennia by reducing Tatea subacaulis F. Muell. to Avicennia officinalis L. Actually, they do no such thing in the reference cited, nor anywhere else as far as I can determine. The generic name Tatea is a synonym of Pygmaeopremna Merr. in the Verbenaceae.

Jackson, in Ind. Kew. 2: 1247 (1895) states that "Zanthoxylum piperitum Benn." in Daniell, Ann. & Mag. Nat. Hist., ser. 3, 10: 200 (1862) is actually a synonym of "Avicennae". Because of this statement, some authors have included this binomial in the synonymy of the genus Avicennia. Actually, Bennett, in the reference cited, discusses "Xanthoxylum piperitum L.", and what Jackson apparently meant to say was that this name is a synonym of Fagara avicennae Lam. in the Rutaceae.

Von Faber, in investigating the pull of water supply in trees, has measured in Avicennia a pressure of 163 atmospheres in the leaves and only 96 atmospheres in the roots. The endosperm morphology of Avicennia is discussed by A. C. Martin, Am. Midl. Nat. 36: 608 (1946) and the pollen morphology by Erdtmann, Svensk Bot. Tidsk. 39: 284 (1945). Junell, Symb. Bot. Upsal. 4: 140--146, 195, & 209 (1934), discusses the pynoecium morphology, while the wood anatomy is described by Record & Mell, Timbers Trop. Am. 528--529 (1924) and Record & Hess, Timbers New World 72--73 (1943). The mechanism of respiratory gas exchange in the roots is set forth in Biol. Abstr. 30: 3771 (1958), and the osmotic relation of the leaves by Bole & Bharucha in Journ. Univ. Bombay 22 (5): 50--54 (1954). In 1947, on my visit to him in his laboratory at São Paulo, Brazil, Dr. Felix Rawitscher told me that he has found that the pneumatophores of Avicennia have very thick-walled parenchyma cells and Y-shaped fibers connecting the cells. He showed me his mounts proving this statement and was of the opinion that this fact had never before been reported in literature.

Stellfeld, in Arquiv. Mus. Paran. 7: 333, 335, 343, & 346 (1949), describes an ecologic zone called "avicenieto". Lindeman, Veget. Coast. Reg. Surin. 57 (1953), speaks of the formation "Avicennietum tomentosae", which he claims should be renamed "Avicennietum nitidae" (an now doubtless needs re-naming again!). The former of these two names was proposed by Dansereau in Rev. Canad. Biol. 6: 448--477 (1947). Lindeman states that this formation is identical with the "Avicennia consocias" of Davis [Carnegie Inst. Wash. Publ. 524, 1942] and of Chapman [Journ. Linn. Soc. Lond. Bot. 52: 407--448, 1944]. Cuatrecasas [Bol. Soc. Bot. Mex. 23: 90 & 91, 1958] speaks in detail of the formation "Avicen-

nietum", on pages 85 & 94 of "Avicennietum nitidae", and on page 91 of "Avicennietum marinae". The epidemiology of malaria map published by the American Geographic Society in 1951 states that malarial areas on the earth are characterized by the presence of Avicennia.

Actually, a good many diverse plants are known as "mangroves" in various parts of the world or grow in close association with them in so-called mangrove lagoons and swamps. Among these may be mentioned the following: in the Acanthaceae: Acanthus ebracteatus Vahl, A. ilicifolius L.; in the Arecaceae: Nipa fruticans Thunb.; in the Bombacaceae: Camptostemon philippinense Becc., C. schultzei Mast.; in the Combretaceae: Conocarpus erectus L., Laguncularia racemosa (L.) Gaertn. f., Lumnitzera coccinea Wight & Arn., L. racemosa Willd.; in the Fabaceae: Pterocarpus officinalis Jacq.; in the Meliaceae: Xylocarpus molucensis M. Roem., X. obovatus A. Juss.; in the Myrsinaceae: Aegialitis annulata R. Br., Aegiceras maius Gaertn. f.; in the Myrtaceae: Osbornia octodonta F. Muell.; in the Pteridaceae: Acrostichum spp.; in the Rhizophoraceae: Bruguiera caryophyllaeoides Blume, B. conjugata Merr., B. eriopetala Wight & Arn., B. gymnorrhiza Lam., Cassipourea spp., Cerriops candolleana Arn., C. roxburghiana Arn., Kandelia rheedii Wight & Arn., Rhizophora apiculata Blume, R. harrisonii Leechman, R. mangle L., R. mucronata Lam., R. racemosa G. F. W. Mey., R. samoensis (Hochr.) Salvosa; in the Rubiaceae: Scyphiphora hydrophyllacea Gaertn. f.; in the Sonneratiaceae: Sonneratia acida L. f., S. alba J. Sm., S. apetala Hamilt., and S. caseolaris Druce.

In the Linnean Herbarium at the Linnean Society, London, under Genus 813, Avicennia, there are the following sheets: Specimen number "1" is labeled "nitida" in Linnaeus' own handwriting and bears the notation "177" -- it is plainly what we now know as A. germinans (L.) Stearn. Specimen number "2" is unnamed -- it bears the notation "Br." [=Browne; Patrick Browne's herbarium was purchased for Linnaeus in 1758] -- Solander has written at the foot of the sheet and has placed a description on the reverse side -- the plant is A. germinans. Specimen number "3" is unnamed -- it bears a notation "cop. api api" and a stamp stating that it was from the herbarium of Linnaeus the younger -- it is A. marina (Forsk.) Vierh. Specimen number "4" is unnamed, but bears a notation "India" and there is a description overleaf -- it is A. officinalis L. Specimen number "5" is unnamed, but also bears a notation "India" and an indication that it came from the herbarium of Linnaeus the younger -- the plant is also A. officinalis.

The Hatch s.n. collection from Jamaica, distributed as "Avicennia" is actually Laguncularia racemosa (L.) Gaertn. f.

Biswas says, on page 165 of the work cited above: "Economically the Avicennias are not of much importance. The wood, which is very brittle, is chiefly used for fuel and sometimes for

house-making. The fruits are bitter and can be used medicinally as a poultice. The bark is employed as a tanning material." Actually, I would challenge the first sentence of this quotation: members of this genus are of tremendous economic importance to man and his economy because of their constant battle with the sea and their great success in extending and eventually building up the surface of the land adjacent to the sea in subtropical and tropical climes.

Avicennia latifolia Hornem. is something in the Myrtaceae.

In all, 4788 herbarium specimens and 173 mounted photographs and illustrations, including the type collections of most of the names involved, have been examined in the preparation of this work.

A tentative key to the species and varieties of Avicennia

1. Modern species.
2. Style normally very short or subobsolete; stigmas subsessile; corolla-limb mostly glabrous on the upper (inner) surface. Section 1. Upata (Rheede) Schau.
3. Natives of Africa, Asia, Australia, and Oceania.
4. Inflorescence elongate and subspicate or spicate.
5. Leaf-blades usually decidedly whitish or silvery beneath, usually sharply acute at the apex; inflorescence 3--10 cm. long and wide, to 30-flowered, mostly compound, often dense; fruit obliquely conic or narrowly oblong to obversely spatulate.
6. Mature leaf-blades usually oblong or elliptic-lanceolate to lanceolate, 1.5--5 cm. wide....A. alba.
- 6a. Mature leaf-blades broadly elliptic, to 6.5 cm. wide.....A. alba var. latifolia.
- 5a. Leaf-blades usually sordid-gray, flavidous, or brownish beneath, obtuse or rounded at the apex; inflorescence to 8 cm. long and 1 cm. wide, simple, 5--10-flowered, the flowers widely scattered; fruit ovate.....A. marina var. anomala.
- 4a. Inflorescence compact, usually capitate or subcapitate to pyramidal.
7. Flowers mostly less than 6 mm. long, 2.5--5 mm. wide when expanded; ovary villous on the upper half, glabrous on the lower half.
8. Leaf-blades sharply acute or acuminate at the apex.
9. Leaf-blades elliptic-oblong.....A. marina var. resinifera.
- 9a. Leaf-blades lanceolate or narrow-lanceolate.
10. Leaf-blades broadly lanceolate, 2--3 times as long as wide; fruit not beaked; Sind to Bombay & Salsette Island.....A. marina var. acutissima.
- 10a. Leaf-blades narrow-lanceolate, 3--5 times as long as wide; fruit beaked; Philippines to

Australia.....A. eucalyptifolia.

8a. Leaf-blades mostly obtuse, rounded, or merely subacute at the apex.

11. Leaf-blades ovate or lanceolate to lanceolate-oblong or elliptic, usually rather abruptly acute (rarely sharply acute) at the apex.....
.....A. marina.

11a. Leaf-blades obovate, rounded at the apex.

12. Petioles 1.5—3 cm. long.....
.....A. marina var. rumphiana.

12a. Petioles mostly less than 1.5 cm. long.....
.....A. lanata.

7a. Flowers mostly more than 6 mm. long, 10--15 mm. wide when expanded; ovary and style long-villous.....
.....A. lanata.

3a. Natives of America.

13. Leaf-blades elongate-oblong, 3--5 times as long as wide, to 17 cm. long but only to 2.8 cm. wide; Costa Rica & Taboga Island to Colombia.....A. tonduzii.

13a. Leaf-blades not elongate-oblong, 2--3 times as long as wide, 1.7--13 cm. long and to 7 cm. wide.

14. Inflorescence congested, spicate; leaf-blades mostly oblanceolate or obovate, sometimes elliptic, to 3.8 cm. wide; Windward Islands and Trinidad to northern Uruguay.....A. schaueriana.

14a. Inflorescence wide-spreading, paniculate; leaf-blades broadly elliptic to elliptic-ovate or oval-ovate, to 7 cm. wide; Chipas to Panama and the Pearl Islands.....A. bicolor.

2a. Style usually manifest, exerted from the calyx when the corolla is shed; corolla-limb often tomentose on both surfaces. Section 2. Donatia (Loefl.) Schau.

15. Natives of Asia, Australia, and Oceania.

16. Fruit oblong, acorn-like, rounded at both ends; leaves lanceolate or narrow-elliptic, acute to long-acuminate or caudate at the apex; corolla-limb to 6 mm. wide during anthesis.....A. balanophora.

16a. Fruit broadly ovate, attenuate at the apex, asymmetric; leaves obovate or broadly oblong, rounded at the apex; corolla-limb 12--15 mm. wide during anthesis.....
.....A. officinalis.

15a. Natives of America and western Africa.

17. West African; leaf-blades mostly narrow and elongate, to 24 cm. long, not nigrescent in drying..A. africana.

17a. American; leaf-blades mostly shorter and relatively broader, 4.5--15 cm. long, usually nigrescent in drying.....A. germinans.

1a. Fossil species.

18. Known from fruit only, in the Eocene of Tennessee.....
.....A. eocenica.

18a. Known from leaves only.

19. Leaf-blades somewhat falcate and inequilateral, from the Eocene of Mississippi.....A. nitidaformis.

19a. Leaf-blades not falcate nor inequilateral.

20. From the Quaternary (Pleistocene) of Trinidad.....A. germinans.

20a. From the Tertiary of Colombia.

21. Leaf-blades lanceolate; secondaries stout.....A. miocenica.

21a. Leaf-blades narrowly ovate or broadly lanceolate to subobovate; secondaries weak.....A. lanceolata.

AVICENNIA AFRICANA P. Beauv., Fl. Oware & Benin 1: 79—80, pl. 47. 1805.

Synonymy: Avicennia tomentosa var. owarensis Walp., Repert. 4: 133. 1845. ?Avicennia rhizophora Barter, Journ. Linn. Soc. Lond. Bot. 4: 22, nom. nud. 1860. Avicennia nitida var. africana (P. Beauv.) V. J. Chapm., Journ. Linn. Soc. Lond. Bot. 52: 429, in obs. 1944. Avicennia agricana P. Beauv. ex Moldenke, Alph. List Cit. 4: 1137, sphalm. 1949.

Literature: P. Beauv., Pl. Oware & Benin 1: 79—80, pl. 47. 1805; R. Br., Prodr. Fl. Nouv. Holl., ed. 1, 1: 518. 1810; Walp., Repert. 4: 13. 1845; Hochst., Flora 28: 68. 1845; Schau. in A. DC., Prodr. 11: 699. 1847; Benth. in Hook. f., Niger Fl. 487. 1849; Schau. in Mart., Fl. Bras. 9: 305. 1851; Barter, Journ. Linn. Soc. Lond. Bot. 4: 22. 1860; Jacks., Ind. Kew. 1: 254. 1893; Durand & De Wild., Bull. Soc. Roy. Bot. Belg. 37: 125. 1898; Durand & Jacks., Ind. Kew. Suppl. 1: 48. 1901; J. Schmidt, Bot. Tidsskr. 26: 60. 1904; Engl. & Drude, Veget. Erde 9 (1): 2, pl. 45. 1910; H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 225. 1910; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 548. 1911; A. Chev., Sudania 2: 47 & 52. 1914; Henriq., Bol. Soc. Broter. 27: 194. 1917; A. Chev., Expl. Bot. Afr. Occid. Franc. 1: 510. 1920; Hutchinson & Dalz., Fl. W. Trop. Afr. 2: 270 & 613. 1927; Crevost & Pételot, Bull. Econom. Indo-chine 37: 1297—1300. 1934; Walter & Steiner, Zeitschr. Bot. 30: 178, 181, 182, & 184—186. 1936; Moldenke, Geogr. Distrib. Avicenn. 30, 31, & 35. 1939; Moldenke, Alph. List Common Names 5, 6, 9, 13, 16, 21, 26, & 27. 1939; Monod, Contrib. Com. Et. Hist. & Sc. Afr. Occid. Franc., sér. B, 5: 204. 1940; Moldenke, Prelim. Alph. List Invalid Names 6. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 46—48, 71, & 86. 1942; Moldenke, Alph. List Invalid Names 5. 1942; Moldenke, Phytologia 2: 92. 1944; Exell, Cat. Vasc. Pl. S. Tomé 39 & 265. 1944; Stellfeld, Arquiv. Mus. Paran. 4: 244. 1945; Moldenke, Alph. List Cit. 1: 4, 31, 33, 35, 40, 48, 50, 54, 74, 76, 78, 80, 82, 101—103, 117, 141, 145, 153, 155, 162, 163, 170, 172, 190, 236, 243, 270, & 276. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 2. 1947; Moldenke, Alph. List Cit. 2: 414, 416, 433, 436, 437, 490, 504, 558, 572, 577, 588, 593, 601, 615, 618, 620, 630, & 631 (1948), 3: 655. 698, 702, 706, 737—740, 770, 810, 825, 828, 865, 876, 878, 906,

934, & 952 (1949), and 4: 984, 994, 996, 1093, 1096, 1106, 1115, 1129, 1137, 1146, 1174, 1220, 1221, 1248, & 1298. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 109—114, 118, 152, & 174. 1949; Moldenke, Phytologia 3: 368. 1956; Moldenke, Résumé 133, 136—140, 146, 213, 236, & 439. 1959; Moldenke, Résumé Suppl. 1: 8 & 15. 1959.

Illustrations: P. Beauv., Fl. Oware & Benin 1: pl. 47 (colored). 1805; Engl. & Drude, Veget. Erde 9 (1): pl. 45. 1910.

Tree, to 18 m. tall; pneumatophores abundant, covering the ground abundantly; stilt-roots not present; branches rather stout; branchlets and twigs more slender, articulate, gray or brownish, subterete or very obscurely angled, very sparsely and not noticeably lenticellate, very finely and densely white- or gray-pulverulent or glabrate; nodes swollen, distinctly annulate; principal internodes 1.3—9.5 cm. long; leaves decussate-opposite; petioles rather slender, 1.2—3.5 cm. long, usually flattened and deeply sulcate above, convex beneath, greatly wrinkled and striate in drying, densely white- or gray-pulverulent throughout, very slightly ampliate at the base; leaf-scars inconspicuous; blades firmly chartaceous or subcoriaceous["very coriaceous" according to Baker], mostly large and elongate, mostly dull gray-green on both surfaces or more whitish beneath because of the whitish or drab furf, varying from lanceolate or oblong-lanceolate to oblong or narrowly elliptic, 4.7—24 cm. long (usually 13—17 cm. long), 1.7—7.9 cm. wide, acute or obtuse (rarely emarginate at the apex, entire, the margins often obscurely subrevolute in drying, acute or subcuneate at the base and gradually narrowed to the short petiole, glabrous and impressed-punctate above and usually very shiny, very densely appressed white- or gray-pulverulent beneath or glabrate and punctate; midrib flat or subprominent above, usually canaliculate for the lower 2/3 or 3/4 of its length above, rounded-prominent to the apex beneath; secondaries slender, 12—17 per side, irregularly placed, ascending at an angle of about 45°, uniformly prominent throughout on both surfaces, straight, plainly joined by a rather irregular and equally prominent collective vein at the margins; tertiaries irregular and more or less parallel to the secondaries and prominent like them on both surfaces; vein and veinlet reticulation rather coarse, only the larger portions prominent; inflorescence axillary and terminal, spicate or subcapitate-spicate, 1 or 2 in all the upper axils, 1.5—4 cm. long, 7—17 mm. wide at anthesis, often forming a small terminal panicle; flowers opposite, decussate, densely crowded, 1—6 pairs per spike, fragrant; peduncles slender, 1—3 cm. long, tetragonal, sulcate and striate in drying, more or less densely pulverulent or finely tomentose; bractlets ovate, 3—4 mm. long; calyx-segments small, oblong; corolla white or whitish, turning bluish in alcohol, pubescent on the inner surface, the limb 4-lobed, the upper lip and 2 lateral lobes borne at right angles to the tube, the lower lobe borne at an angle of 45° to the tube, the lobes as long as the tube, pubescent on both surfaces; stamens 4, the 2 outer ones at first longer than

the inner ones, later all equal in length; filaments white; anthers at first white, later gray, finally black; pistil 1, white, shorter than or equaling the filaments, equaling the corolla-tube; style 1.5--2 mm. long, glabrous; ovary conic, gradually attenuate above into the style, glabrous; fruiting-calyx 5-parted practically to the base, about 9 mm. in diameter, each lobe ovate, about 4 mm. long and 2 mm. wide at the base, obscurely strigillose or subglabrate on the back, the margins often slightly fringed toward the base, glabrous and shiny on the inner surface, acute or obtuse at the apex, imbricate; fruit elliptic, 1.7--2.8 cm. long, 1.1--2 cm. wide, long-acuminate-beaked at the apex, densely gray-pulverulent throughout and often sparsely appressed-strigose at the apex and on the apiculation; hypocotyl almost as long as the inner cotyledon, pubescent almost its whole length, mostly without visible side-rootlets in fruit; plumule not visible to the naked eye.

The species is based on an unnumbered collection of Baron Ambroise Marie François Joseph Palisot de Beauvois, deposited in the Delessert Herbarium at Geneva, collected somewhere in Guinea. The species is found in the brackish water of lagoons, and is common in the mangrove belt along the coasts. Deighton reports that in the Turtle Islands of Sierra Leone it is nearly as common in some places as Rhizophora. He says also that its bark is used in tanning and to make a red dye, just as is that of Rhizophora. Specimens have been confused with and misidentified as Rhizophora (e.g., Dewevre s.n.) and as something in the Myoporaceae. It has been collected in anthesis from August to June, and in fruit in October. Exell records it from Saint Tomé, while Baker cites a Vogel s.n. from Cape Palmas in Ivory Coast. Chevalier also records it from Ivory Coast (his no. 19908). He likewise cites his nos. 2760, 3009, and s.n. from Senegal and 13818 and 13823 from Ghana. His 2759 is cited by him from Senegal, but the Brussels specimen of this number is marked on its label as being from the French Soudan. The species is said by Dinklage to grow in association with Rhizophora racemosa G. F. W. Mey. in Liberia. Barter records an "Avicennia rhizophora" as occurring in Principe about the estuaries of small streams. Exell comments that "It is doubtful what he meant by the name 'Avicennia rhizophora'". It is possible that he meant to say that both Avicennia africana and Rhizophora racemosa occur together there.

The name "Avicennia tomentosa L." cited by me as a synonym of A. africana in my Alph. List Invalid Names Suppl. 1: 2 (1947) and Résumé 236 (1959) is actually a synonym of A. marina (Forsk.) Vierh., since it apparently started in Hochst., Flora 28: 68 (1845) where it is definitely applied to a Natal plant called "witte mengerhout".

The axillary inflorescences are sometimes borne on short twigs which bear one pair of reduced leaves and three spikes. Reniform leaf-blades are seen on Soyaux 60 due to some injury to the leaf-apex. The specific name of the binomial is often upper-cased in

older literature. Common names recorded for the plant include "afia-nunung", "amu-ati", "amu-tsi", "angma-tsho", "asokoro", "asokpolo", "asopro", "asukuru", "ata-nunung", "black mangrove", "boandjo", "boanjo", "bue", "bue", "bue-dinte", "bue-dinte", "buwe", "common white mangrove", "ē-bure", "ede", "ehrodo", "garigari", "gbeleti", "gbēleti", "grigri", "jaia-guli", "jaia-guwi", "ka-bure", "lagoon tree", "mbougand", "mofuri", "mutuku-tsho", "nja-wului", "nvandi", "odonumon", "ogbun", "roanjo", "saanar", "samar", "sana", "tarrafe", "tra-tsho", "ufiri", "waterside tree", and "white mangrove". Btjgen calls attention to the fact that the name "boanjo" is not to be confused with the very similar "boango", which applies to an entirely different plant. It is worthy of note that the name "grigri" is applied also to the American Vitex heptaphylla A. L. Juss.

Glaziou 11323, from Espirito Santo, Brazil, is cited by the collector, in the reference cited above, as A. africana with a question, but is actually A. schaueriana Stapf & Leechman.

The species is admittedly very closely related to the American A. germinans (L.) Stearn, formerly known as A. nitida Jacq. It is accepted as a valid species, however, by Bentham (1849), Schauer (1851), Durant & De Wildeman (1898), Baker (1900), and Exell (1944). Schauer says "Proxima Av. nitidae diversa tamen; foliis obtusis, supra minus nitidis (neque siccitate nigrescentibus) subtus neque niveis neque (quantum equidem cognovi) calvescentibus. Quad floris fabricam cum illa fere convenit." Baker says "Perhaps not distinct specifically from the American A. nitida". Briquet, Stapf, Hutchinson & Dalziel, Darlington & Janaki Ammal, and Walter & Steiner all sink it into synonymy under A. nitida. It is referred to an "A. tomentosa L., R. Br. Prodr. 1: 518. 1810" by Dollinger. Bentham says "Probably not distinct from the American A. nitida. Pearson, on the other hand, reduces it to A. officinalis L., which is utterly out of the question!

The N. W. Thomas specimen at Kew actually exhibits leaves with the puberulence disappearing beneath, leaving just patches of it here and there, as is seen so often in A. germinans. The condition is, however, apparently unusual in A. africana. The narrow elongated leaf-blades, so characteristic of the African plant, are seen only occasionally in America. In fact, it is perhaps possible that the American plants with such leaves may actually be A. africana, and that we are including too much in the present concept of A. germinans.

In all, 234 herbarium specimens, including the type, and 19 mounted photographs and sheets of notes have been examined.

Henry Millen's name is incorrectly given as "H. Millon" by me in my Alph. List Persons 87 (1950).

Citations: FRENCH WEST AFRICA: Mauritania: Chudeau 48 (P). Senegambia: A. Chevalier 2760 (K); Collector undesignated s.n. [Senegambia] (Le, V); Herb. Bernhardi s.n. [Senegambia] (E-118607); Heudelot s.n. [Senegambia] (Cb); Perrottet 184 (Dc), s.n. [1824] (Dc). SAINT LOUIS ISLAND: Brunner 1 (K). SENEGAL: Bojer s.

n. (Cl); Brunner s.n. [Senegal] (Cb); A. Chevalier 2759 (B, Br, N—photo, Z—photo); Döllinger 73 (K), s.n. [Senegal] (Cl, Vt); Herb. Zuccarini s.n. (Mu—1067); Leprieur s.n. [Ile de Jafal, Oct. 1825] (Cb, Cb), s.n. [1829] (V), s.n. [1830] (V), s.n. [Senegal] (Le); Perrottet 654 (Cb, V, X), s.n. [15 Feb. 1825] (Cb), s.n. (Bm); Roger 75 (K). GAMBIA: M. T. Dawe 72 (K); G. Don s.n. (Bm); Herb. Shuttleworth 16 (Bm). GUINEA: P. de Beauvois s.n. (Cb—type, Cb—-isotype, Cb—-isotype, Cb—-isotype, Dc—-isotype, N—photo of type, Z—photo of type); Bové 31 (Cb); Isert s.n. [Ada, 1784] (Cp, Cp); Thonning s.n. (Cp, Dc, S). FRENCH GUINEA: Debeaux s.n. [24 Avril 1902] (P). SIERRA LEONE: Afzelius s.n. (B, S, Us, Us, Us); Burbridge 584 (K); Dalziel 970 (Bm, K, N); Don 168 (K); G. F. S. Elliot 4120 (Bm, K); Glanville 246 (K, K); Hooker f. 618 (Us); Lane-Poole 320 (K); G. Mann vii (K); N. W. Thomas 7070 (K); Vogel 168 (Cl); Wilford s.n. (Cl). TURTLE ISLANDS: F. C. Deighton 2362 (K). LIBERIA: Dinklage 1910 (B, B, B, Bm, Br, Ed, Gg—237833, N, N, V, Vu), 2593 (B, B, N—photo, Z—photo); H. H. Johnston s. n. [Sinoe basin] (K). GHANA: Chipp 175 (K); H. H. Johnston 984 (K); Krause 60 (B), 87 (B); J. W. Newberry s.n. (K). TOGOLAND: Warnecke 63 (B, B, Bm, Mu—3986, N—photo, Z—photo). NIGERIA: Southern Nigeria: Barter 46 (K); Bels 92 (Ut—5491b); Chief Conservator of Forests 1 (N), 1a (N), 1b (N), 2 (N), 2a (N), 2b (N), 3 (N), 3a (N), 3b (N), 4 (N), 4a (N), 4b (N), 4c (N), 5 (N), 5a (N), 5b (N), 6 (N), 6a (N), 6b (N); Dalziel 970 (Ed); W. MacGregor 341 (K, K, K, K, K); Mildbraed s.n. [Jan. 1929] (B, B, N, N—photo, Z—photo); Millen 184 (B, Br); Rosevear M.16 (K); J. W. Rowland s.n. [Nr. Lagos] (K); Talbot & Talbot 3087 (Bm), s.n. [Eket district] (Bm, K); Vogel 101 (K, K, N), s.n. [Gd. Bassa] (K); Wudin 56 (K, N—photo, Z—photo). CAMEROONS: G. L. Bates 195 (K); Besser 15 (B), 26 (B); Buchholz s.n. (B); Busgen 354 (B, B); Deistel 40 (B, Mu—3819, N), 172 (B, N); Dusén 347 (B, B—notes, Lu, N, S), s.n. (X); Hückstadt 19 (B); Jungner 263 (Us); Kwankam CAM.2/38 (N, N, N), CAM.3/38 (N, N, N); Maitland 30 (K); Preuss 1191 (B, Bm); Schorkopf 65 (B, N, N—photo, Z—photo). FERNANDO PO: G. Mann 231 (B, K, P); Mildbraed 6971 (B, B, N, N—photo, S—photo, Z—photo); Milne s.n. (K). FRENCH EQUATORIAL AFRICA: Gab-un: Büttner 345 (B, Ca—616067, V); Klaine 106 (B), s.n. (B). Middle Congo: Thollon 208 (B). PORTUGUESE CONGO: Gossweiler 8264 (Bm, K, K); Soyaux 60 (B, B). BELGIAN CONGO: Bequaert 587 (Br, Br), 754 (Br, Br), 7992 (Br, Br); Buchner 573 (B); Dewevre 48 (Br, Br), s.n. (Br); Dupuis s.n. (Br); Gillet 3170 (Br), 3993 (Br); Henrard s.n. [Banane, Jan. 1935] (N, N), s.n. [Banane, Fevrier 1939] (Br); Schouteden, Schouteden-Wery, & Poma 63 (Br, N); Vanderyst 27363 (Br), 27406 (Br), 27421 (Br); Vermoesen 2511 (Bm, Br, Br, K, N), 2595 (Br, Br). ANGOLA: Benguela: H. Bolus 12459

(Ct). Loanda: Collector undesignated s.n. [Angola] (P); Gossweiler 178 (B, Bm, K), s.n. (K); Soyaux 60 (K); Welwitsch 5641 (B, Bm, Bm, Cp, K, P), 5709 (Bm, K), 5726 (B, Bm, Cp, K, N, P). CULT-
IVATED: Cameroons: Versuchsanstalt Kamerun 205 (B); H. Winkler 380 (B, B). LOCALITY OF COLLECTION UNDETERMINED: Afzelius s.n.
[Westafrika] (B); Collector undesignated s.n. (B, Br); Herb. Martius s.n. (Br); Koeler 39 [Bonna] (V); Sieber, "Fl. Nov. Holl. 19" (B). MOUNTED ILLUSTRATIONS: Sousa, Fl. de Guinea s.n. (Cp).

AVICENNIA ALBA Blume, Bijdr. Fl. Ned. Ind. 14: 821. 1826 [not A. alba Karst., 1907, nor Wight, 1921].

Synonymy: Anacardium C. Bauhin, Pinax Theatr. Bot., ed. 1, 511. 1623. Avicennia resinifera Griff., Trans. Linn. Soc. Lond. Bot. 20: 6, pl. 1 (1846) & Notul. Plant. Asiat. 4: 186. 1854 [not A. resinifera Forst., 1786]. Avicennia officinalis var. alba (Blume) C. B. Clarke in Hook. f., Fl. Brit. Ind. 4: 604. 1885. Avicennia spicata Kuntze, Rev. Gen. Pl. 2: 502. 1891. Avicennia tomentosa Blume apud H. Hallier, Meded. Rijksherb. Leid. 37: 87, in syn. 1918 [not A. tomentosa Blanco, 1845, nor R. Br., 1851, nor Jacq., 1760, nor L., 1826, nor L. & Jacq., 1783, nor G. F. W. Mey., 1818, nor Nutt., 1947, nor Nutt. & Br., 1832, nor Roxb., 1835, nor Schau., 1940, nor Sieber, 1944, nor Sw., 1864, nor Vahl, 1921, nor Weigelt, 1851, nor Willd., 1822]. Avicennia marina var. alba (Blume) Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 204 & 207--210. 1921. Avicennia officinalis H. J. Lam ex Moldenke, Prelim Alph. List Invalid Names 5, in syn. 1940 [not A. officinalis L., 1753, nor Maxim., 1932, nor Millsp., 1930, nor Schau., 1856]. Avicennia acuminata Cornwall ex Moldenke, Résumé 235, in syn. 1959. Avicennia albida Blume, in herb.

Literature: Linschotten, Part 4, Ind. Or. C. 29. 1596; C., Bauhin, Pinax Theatr. Bot., ed. 1, 511. 1623; Rumph., Herb. Amboin. 3: 115--116, pl. 76. 1750; Lam., Tabl. Encycl. Méth. Bot. Suppl. 1: 329--330 (1783), pl. 540. 1810; Blume, Bijdr. Fl. Ned. Ind. 14: 821. 1826; Decaisne, Nouv. Ann. Mus. Hist. Nat. Paris 3: 402--403. 1834; Decaisne, Herb. Timor 74. 1835; Fresenius, Flora 21 (2): 607. 1838; Dietr., Syn. Pl. 3: 619. 1843; Griff., Trans. Linn. Soc. Lond. Bot. 20: 6, pl. 1. 1846; Wight, Icon. Plant. Ind. Orient. 4: pl. 1482. 1849; Wight, Illustr. Ind. Bot. 2: 217. 1850; Griff., Notul. Plant. Asiat. 4: 186. 1854; Miq., Fl. Ned. Ind. 2: 913. 1856; Hassk., Neue Schlüss. 57. 1866; C. B. Clarke in Hook. f., Fl. Brit. Ind. 4: 604. 1885; Kuntze, Rev. Gen. Pl. 2: 502. 1891; Jacks., Ind. Kew. 1: 254. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 181. 1894; Koord. & Val., Bijdr. Booms. Java 7: 217--222. 1900; Volkens in Engl., Bot. Jahrb. 31: 474. 1901; Prain, Bengal Fl. 2: 838. 1903; J. Schmidt, Bot. Tidsskr. 26: 60. 1904; Cooke, Fl. Pres. Bombay 436. 1908; King & Gamble, Mat. Fl. Mal. Penins. 1078. 1909; Warming & Vahl, Ecol. Pl., ed. Groom, 235--236. 1909; Talbot, For. Fl. Bombay 2: 363. 1911; H. Hallier, Meded.

Rijksherb. Leid. 37: 87. 1918; H. J. Lam, Verbenac. Malay. Arch. 340--341. 1919; Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 205 & 207--210, pl. 15. 1921; Cowan, Rec. Bot. Surv. Ind. 11: 199, 200, 203, 219, & 220. 1928; Domin, Bibl. Bot. 89 (6): 1116. 1928; J. G. Wats., Malayan Forest Rec. 6: 61 & 62. 1928; Ridl., Dispersal Pl. 310. 1930; Mullan, Journ. Ind. Bot. Soc. 11: 302--303, pl. 2. 1932; Warming & Graebn., Lehrb. Oekol. Pflanzengeogr., ed. 4, 473. 1933; Junell, Symb. Bot. Upsal. 4: 140--142 & 144, figs. 221 & 223--229. 1934; Biswas, Notes Roy. Bot. Gard. Edinb. 89: 159--166, pl. 245 & 246. 1934; Crevost & Pételot, Bull. Econom. Indo-chine 37: 1297--1300. 1934; Moldenke, Alph. List Common Names 3, 11, 14, 18, 21, 27, 30, & 31. 1939; Moldenke, Geogr. Distrib. Avicenn. 32--34. 1939; Moldenke, Suppl. List Common Names 2 & 4. 1940; Moldenke, Prelim. Alph. List Invalid Names 5 & 6. 1940; Kanehira & Hatusima, Bot. Mag. Tokyo 56: 112. 1942; Moldenke, Alph. List Invalid Names 4 & 5. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 54--56, 58--61, 63--67, 69, & 86. 1942; Moldenke, Phytologia 2: 92. 1944; Moldenke, Alph. List Cit. 1: 9, 16, 26, 30, 35, 36, 42, 46, 49, 52, 71, 80, 101, 112, 116, 117, 120, 124, 128, 135, 191, 192, 196, 197, 209, 210, 247, 248, 252--254, 256, 266, 267, 270, 276, & 319. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 2. 1947; Moldenke, Alph. List Cit. 2: 353, 354, 404, 426, 433, 437, 449, 463, 464, 500, 501, 538, 557, 560, 576, 585, 602, 603, 607, 608, 614, 615, 619, 624, 625, 629, & 630 (1948), 3: 673, 685, 702, 706, 716, 724, 739, 745, 751, 756, 763, 774, 779, 794, 795, 815, 824, 827, 838, 866, 878, 879, 895, 902, & 903 (1949), and 4: 983, 984, 987, 1014, 1029, 1036, 1067, 1081, 1097, 1100, 1105, 1129, 1148, & 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 124, 125, 128, 129, 135, 137--140, 142--146, 148, 150, 152, & 174. 1949; Santapau, Pl. Saurashtra 31. 1953; Moldenke, Phytologia 4: 192 & 195. 1953; Lindeman, Veget. Coast. Reg. Surin. 52. 1953; Bole & Bharucha, Journ. Univ. Bombay 22 (5): 50--54. 1954; Biol. Abstr. 29: 170 (1955) & 3118. 1957; Moldenke, Résumé 158, 160, 165, 166, 175, 177, 179, 182, 186, 187, 189, 191--194, 196, 198, 200, 204, 207, 234--236, & 440. 1959; Moldenke, Résumé Suppl. 1: 12 & 13. 1959.

Illustrations: Rumph., Herb. Amboin. 3: pl. 76. 1750; Lam., Tabl. Encycl. Méth. Bot. pl. 540. 1810; Griff., Trans. Linn. Soc. Lond. Bot. 20: pl. 1. 1846; Wight, Icon. Plant. Ind. Orient. 4: pl. 1482. 1849; Wight, Illustr. Ind. Bot. 2: 217. 1850; Talbot, For. Fl. Bombay 2: 363. 1911; H. J. Lam, Verbenac. Malay. Arch. pl. 3 M, N, & O. 1919; Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: pl. 15. 1921; J. G. Wats., Malayan For. Rec. 6: 61 & 62. 1928; Mullan, Journ. Ind. Bot. Soc. 11: 302--303, pl. 2. 1932; Junell, Symb. Bot. Upsal. 4: figs. 221 & 223--229. 1934; Biswas, Notes Roy. Bot. Gard. Edinb. 89: pl. 245 & 246. 1934.

Shrub or large tree, to 25 m. tall, often branching from near the base of the trunk; crown broad; trunk with a girth rarely to 1.5 m., sometimes to 1 m. in diameter at breast height, usually only to 20 cm. in diameter, often with a bole 4 m. clear of branches, blooming when very young; bark 1--5 mm. thick, the

outer bark greenish-black or dark-brown to dark black-brown or blackish, warty or smooth, often with many short longitudinal fissures or reticulate lines forming very small scales and with numerous, small, circular, pale-brown, lenticellate nodules, the under bark cream-colored with green reticulation, the inner bark green on the back, cream-colored within, spongy in texture, about 6 mm. thick; wood soft, distinctly layered, yellow-brown or creamy with brownish concentric wavy bands containing spirally arranged white fiber strands, the fiber in every other layer longitudinal, alternating with oblique fiber, the sapwood not defined or about 2--3 cm. deep and straw-colored, the heartwood slightly darker; pneumatophores 5--22 cm. long, slender, about as thick as a pencil, surrounding the tree; branches spreading; branchlets spreading, drooping, terete, smooth, yellow, sparsely and obsoletely lenticellate, sparsely resinous-punctate, furfuraceous-tomentellous on the youngest parts, eventually glabrescent; leaves decussate-opposite; petioles short, 0.5--3 cm. long, densely pulverulent-tomentellous; leaf-blades oblong or elliptic-lanceolate to lanceolate, rarely short and ovate-elliptic, 3--16 cm. long, 1.5--5 cm. wide, acute at the base and apex or rarely subobtuse at the apex, sometimes suddenly tapering at the base, slightly revolute along the margins, glabrous and glossy above, shiny-green, very minutely impressed-glandulose-punctate, grayish or silvery to whitish-pulverulent or white-tomentose beneath (decidedly whitish or canescent in drying), resinous-punctate; midrib appressed-tomentellous; secondaries 7--15; veinlet reticulation plain on both surfaces; inflorescence terminal, paniculate, almost compound, subfoliose, rarely in dense heads, green when fresh except for the corollas, 3--10 cm. long and wide, the panicles terminal and borne in the upper leaf-axils, solitary or paired, short, subpinnae, compact, often interrupted, pedunculate, usually not glabrescent, composed of 1--3 pedunculate branches; subfoliaceous bracts rarely present; cymes spiciform, more or less dense and elongate, 0.5--2 cm. long, 0.7--1 cm. wide, composed of 10--30 opposite flowers; peduncles tetragonal or terete, densely appressed-furfuraceous, ashy-gray, often with an orange tinge, sulcate in drying, densely but inconspicuously resinous-punctate and sparsely and obsoletely glandulose; bractlets small, concave, sessile, ovate or orbicular, green or slightly orange-tinged, obtuse at the apex, densely rufous-tomentellous on the outside, deciduous; prophylla 2, oblong, obtuse at the apex, 3--5 mm. long, 2--3 mm. wide, ciliate-margined, furfuraceous-tomentellous toward the base outside, with a prominent midrib, glabrous within or sparsely white-pilose at the middle; flowers small, sessile, sweet-smelling; calyx small, the 5 lobes slightly unequal, rounded-ovate, 3--5 mm. long, 2--3 mm. wide, densely ciliate on the margins, green and rugulose on the outer surface, soon becoming scarious, densely white-tomentellous toward the base, glabrous and shiny toward the apex, glabrous and shiny on the inner surface, sparsely resinous-punctate on both surfaces; corolla small, rather thick-textured, yellow or dull-yellow to orange-yellow or orange, regular, 4--5 mm. long, about

5 mm. in diameter, split to the middle, dropping after anthesis, the tube campanulate or cylindric, equaling or shorter than the calyx, 1.2--2 mm. long, 1.5--2 mm. wide at the mouth, glabrous outside, the 4 lobes uniform, rather obtusely oblong or lingulate, radially spreading, 2--2.5 mm. long, 1.5--2 mm. wide, very densely white-villosulous with glistening hairs on the outer surface, glabrous on the inner surface; stamens 4, yellow, scarcely exerted, 1.5--2 mm. long, much shorter than the corolla-lobes; filaments short, 0.5--0.7 mm. long; anthers very small, subrotund, 0.7--1 mm. wide, yellow at first, later becoming deep-purple or black; pollen white, spherical when fresh, 28--30 μ in diameter, with 3 hyaline protuberances; pistil shorter than the corolla-tube; ovary ovoid or oblong, glabrous at the very base, densely whitish-pilose with appressed hairs toward the apex, densely resinous-punctate, imperfectly bilocular, the dissepiment not reaching the apex, longitudinally alate at the middle, a single ovule between the wings; style very short and stout or obsolete, 0.5--1.5 mm. long, somewhat contracted at the base, glabrous, hardly changed after anthesis, included by the calyx; stigma plain, equally bifid, the branches accrescent after anthesis and soon recurved, equaling the calyx or somewhat exerted; fruit capsular, medium-sized, greenish-yellow, obliquely conic or narrowly oblong to obversely spatulate, laterally compressed, not beaked, gray-tomentose; cotyledons medium-sized, 2.5--3.5 cm. long, 1.2--2 cm. wide, subcordate, purplish-green; the young plants purplish-green; hypocotyl small or medium, teretely cylindric, rather densely long-setaceous at the very base, otherwise glabrous; primary leaves medium, oval to oblong or obovate, obtuse or rounded at the apex.

This is in general a very well-marked species, abundant in mangrove swamps. In Papua Brass found it common at the outer edge of very tall mangrove forests, leaning out over the water. It has been collected in anthesis in every month of the year. In Java it fruits mostly in February and March. In India it blooms generally from April to June, and the fruits ripen in August and September. It is said to be a common tree in the mangrove belt in Papua. Some collectors describe the tree as "red", but what is meant by this is not clear. Specimens have been misidentified as A. intermedia Griff., A. marina (Forsk.) Vierh., and A. officinalis L. The Holtze s.n. from Australia was actually determined as A. officinalis by Baron F. Mueller. Briquet sinks the species into the synonymy of A. officinalis, while Clarke considered it to be a variety of A. officinalis and Bakhuizen van den Brink made it a variety of A. marina. The Herb. Bogor. 16968 collection is actually a mixture of A. alba and A. officinalis. Maingay 1209 and 1765 were annotated by Kuntze as A. spicata.

Domin, who follows Clarke in reducing A. alba to varietal status under A. officinalis, says (1928): "KOORDERS und VALETON unterscheiden in Bijdr. Booms. Java VII. p. 217--222 (1900) zwei Arten aus Java und zwar A. officinalis L. und A. alba Blume, zu welch letzterer sie die A. resinifera Griff. als Synonym ziehen;

trotz der grossen Unterschiede der typischen Formen scheint mir jedoch, wenigstens nach dem südafrikanischen, polyneisischen und australischen Materiale zu urteilen, die spezifische Abtrennung der letzteren kaum ratsam zu sein." On the other hand, Bakhuizen van den Brink, who regarded it as a variety of A. marina and drew his description from living plants in Java, states that "this variety is very constant" and shows only a few differences in the size of its leaves. "It is immediately recognizable by its appearance like a Willow, the white-silvery under-surface of the leaves, its rich inflorescence consisting of straight spikes, but especially from the conical form of the fruit and the seedlings. The seeds may be found sprouting in the full fruiting season...drifting in great quantities in the marshes of the beach, or scattered along the coast." Wherever these seedlings congregate, they form bunches with their roots strongly entangled, resembling a monstrosity which is called in Dutch "rattenkoning" or "rat's-king", resembling a large number of rats with their tails entwined. At other times "they may form long strings, united by fibrous remnants of plants. The hypocotyls of the seedlings are provided with well-developed, hooked hairs", which cause the seedlings to become bunched into floating masses, not easily separable. "The first little leaves of the seedlings, with their violet-brown cotyledons and petioles, in total opposition with the later lanceolate, pointed leaves of the full-grown tree are oval or oblong, often even obovate, always obtuse or rounded at their top,and generally of a slight purple hue."

Lamarck, on page 330 of the reference cited above, describes an "Avicennia tomentosa L. & Jacq." which he cites to "Jacq., Amer. p. 178, pl. 112, f. 2". Actually, Linnaeus' plant, according to herbarium specimens seen by me bearing that binomial, is A. africana P. Beauv., while Jacquin's plant is A. germinans (L.) Stearn. The other synonyms which he cites also apply to the latter species, except for Oepata Rheede, which is A. officinalis. Lamarck's plate, however, appears to be A. alba.

Kusche says that in the Solomon Islands "The natives use the roots of this tree for sexual diseases by burning the wood of [the] root and eating the ashes left. This will cure all sexual sickness." The osmotic relation of the leaves is discussed by Bole & Bharucha in the 1954 reference given above, while Junell (1934) discusses the gynoeceum morphology.

The Teijsmann s.n. from Banka and the Labohm 1964 from Borneo exhibit some leaves which vary toward those of var. latifolia. The Domin s.n. [III.1910] from Stradbroke Island, Queensland, cited by him in Bibl. Bot. 89 (6): 1116 (1928) as "eine sehr breitblättrige Form" may be var. latifolia. I have not as yet seen this collection. He cites also Dietrich 1313 and 2354 and Domin s.n. [XII.1909] from Queensland as typical A. alba.

Common names recorded for this species are "api-api", "api-api hitam", "arir", "bani", "bina", "bities", "black api-api", "borbor", "bowak daoen ketjil", "djambéj", "dudhi bæn", "dudli

bàen", "elava", "faba malaccana", "gundu mada", "kajoe api-api", "kajoe bakan laki-laki", "kaisseru", "kala baen", "kauwsia", "ki api-api", "kowak", "lame-ah-net", "lameh", "lamet", "mada", "mame", "marne", "nalla mada", "oepata", "padjapih", "reng-gouw", "rosrosan", "samair dam", "tarul baen", "telia baen", "thamé", "tivar", "ton samair", "unte unte", and "white mangrove". It is worthy of note that the name "api-api" is also applied to A. marina var. rumphiana (H. Hallier) Bakh. and "lamet" to A. officinalis L.

Bakhuizen van den Brink reports that "The wood is used everywhere by the people living on the coast and [by] sailors as firewood, for which reason the plant has been named Api-api. More seldom one finds the wood being mentioned as being used for building purposes, especially for the interior of houses, or as in Borneo (according to LABOHN) in the mines; according to KURZ, it has been used in the Andaman Islands for rice-mills and rice-stampers. The fruit is often eaten by the inhabitants of the coast, and this not only in times when food is scarce, as it has been often claimed. — According to fishermen of Tandjong-Priok, Batavia, the seeds are first well-cooked for this purpose, then dried in the sun, and only after this operation are they eaten in the state of pulp." He goes on to say that the seeds of A. alba and of A. officinalis seem to be the most suitable for this purpose, according to native sayings, while those of A. marina are considered inferior, or, at any rate, have to remain one week submerged in water before being suitable for consumption. According to Linschoten, as quoted by Bauhin, the unripe fruit is preserved by the natives either in salt or vinegar.

Bakhuizen van den Brink further states that the species occurs in Sind and in China, but I have not as yet seen any material of it from those countries, nor does he actually cite any from there. His Sind record seems to be taken from Cooke. Biswas says that A. alba "is the predominant species along the margins of creeks, khals, and rivers in Chittagong."

Biswas states, further, that the "leaves in the seedling stage all more linear than lanceolate". It is the only Indian species, by the way, for which he adopted the same specific name as is adopted by me!

In all, 348 herbarium specimens and 1 mounted illustration have been examined,

Citations: INDIA: Bombay: Feilberg s.n. [Oct. 1868] (Cp). Madras: Cornwell 2 (Dd); Foulkes 103 (Cl, Cl), 105 (Cl, Cl); Lushington s.n. [Nizampatan] (K). Orissa: Haines 4142 (K). West Bengal: Biswas 742 (Cl, Cl, Cl); J. M. Cowan 763 (Ed), s.n. [Chittagong, 14/4/27] (Ed); Herb. Forest Research Instit. Dehra Dun 4358 (A, N, Y), 4360.1 (N); Lace 2336 (Dd, Ed, Ed, K); Nath 332a (Dd), 337 (Dd), 4135 (Dd, Dd, Dd), 4135a (Dd); D. Prain s.n. [Aug. 5, 1902] (Bz—16967, Cl, Cl, Cl, Dd, K, W—516515), s.n. [Aug. 7, 1902] (Cb, Cl, Cl, Cl, Cl, K, Na—19556, V, Vu); Sarkar IIIa (Cl), IIIb (Cl), IV (Cl). State undetermined: Collector un-

designated s.n. [Takwapar, 8.7.27] (Cl, Cl); Roxburgh XIV (Ed, Ed), s.n. (Ed). BURMA: Tenasserim: H. Falconer 241 (Cb, Cl, Le, Mu—1068); W. Griffith 6071 (B, Cl, K, P); Khant 11361 (Dd, Dd); Meebold 14301 (B); C. S. Parker 2772 (Dd); C. E. Parkinson 2024 (Dd, Dd, K); C. G. Rogers 169 (Cl, Cl), 417m (Cl). PATAW ISLAND: R. N. Parker 2772 (B, Cb, V). INDO-CHINA: Cochinchina: Chevalier 36391 (P); Germain 17 (Cb, Cb, Cb), 20 (Cb, P), s.n. (B); Harmand 725 (P); Pierre 825 (P), 1863 (Bm, Le, P), s.n. [Baria] (B, P, S); Poillane 501 (B, P); Talmy 1 (P). THAILAND: Herb. Roy. Forest-ry Dept. Siam 2 (N); A. F. G. Kerr 4027 (K); Lakshnakara s.n. [Smae Dam, July 14, 1934] (F—752076, N); Marcen 82 (Bm), 689 (Bm); J. Schmidt 141 (Cp, Mu—4168). MALAYA: Lumut Island: Herb. Forest Dept. F. M. S. 16708 (A, N), 36618 (A, N), 36619 (A, N), 36620 (A, N), 36621 (N), 36622 (N), 36623 (N), 36624 (N). Malacca: Burkill 1305 (K); Collector undesignated s.n. (Cb); W. Griffith s.n. [Malacca, 1845] (K), s.n. [Malacca] (Br, K); Maingay 1209 (K), 1765 (K). Negri Sembilan: Usop s.n. [Herb. Forest Dept. F. M. S. 554] (K). Pahang: Murdock 322 (Cl). Penang: Forest Ranger s.n. [Herb. Forest Dept. F. M. S. 16716; timber spec. 2440] (N), s.n. [Herb. Forest Dept. F. M. S. 16718; timber spec. 2442] (N). Pulau Island: Ahmad s.n. [Herb. Forest Dept. F. M. S. 3889] (K). Selangor: Cubitt s.n. [21 Feb. 1917] (K, K); Ujang s.n. [Herb. Forest Dept. F. M. S. 4722] (K). Singapore: T. Anderson 177 (Cl); Burkill & Shah 405 (Ng—16858); Furtado 18642 (Bz—16966); Herb. Bogor. 16968, in part (Bz); King's Collector 1152 (Cl, Cl); H. Kunster 1152 (K); Kuntze 6045 (N); S. Mayer s.n. [III.1896] (V); Nur s.n. [Sungai Benban, May 29, 1934] (F—752070, N); J. Schmidt s.n. [Singapore, 1/4/1900] (Cp). Wellesley: F. T. Brooks 7 (K). PHILIPPINE ISLANDS: Mindanao: Bolster s.n. [Suriyas, Sept. 22, 1906] (Ca—239723); Elmer 12006, in part (Ut); W. I. Hutchinson s.n. [Philip. Forest. Bur. 3947] (B, K, N, N, W—706218); D. P. Miranda s.n. [Philip. Forest. Bur. 17958] (Ka—64783, Mi, Mi). CAROLINE ISLANDS: Korrör: Kanehira A.1752 (N). Pelew Islands: Kanehira 349 (N). Yap: Volkens 193 (B). RIOUW ARCHIPELAGO: Bantan: Bünne Meyer 6504 (B, K, Le, P, Ut, V). Riouw: Desman 8 [Boschproefst. BB.10735] (Bz—16961, Bz—16962). SUMATRA: Boschprofst. C.C.14464 (Le); Gusdorf 8 (Le); Hagen s.n. [7/6/91] (V); Koorders 10591b (Bz—16951, Bz—16952); Lörzing 6029 (Bz—16949, Bz—16950, Le), 7285 (Le); H. S. Yates 1110 (B, Bm, Bz—16943, Ca—244233, Cb, P, V, W—1505729). JAVA: C. A. Backer 7293 (Bz—16858, Bz—16859), 7746 (Bz—16905), 21443 (Bz—16860, Bz—16861, Bz—16862, Bz—16863, Bz—16864, Bz—25448), 32872 (Bz—16902, Bz—16903), 32875 (Bz—16893), s.n. [Oct. 1904] (Le, P); Bakhuizen van den Brink 947 (Bz—25451), 1172 (Bz—16865, Bz—16866, Bz—16867, Bz—25452, Bz—25453, Bz—25453, Le, Ut), 1190 (Bz—17125, Bz—17126, Bz—25463), 1191 (Bz—16870, Bz—16871,

Cl, Le, P, Ut, Ut--34039a), 1421 (Le, Ut--24863a), 1718 (Bz--16856), 1719 (Bz--16855), 1720 (Bz--16857), 1721 (Le), 1722 (Le), 2112 (Bz--16869), 6767 (Le); Bijhouwer 190 (Bz--16836); Blume 1700 (Le, Le, Le); Boschma s.n. [Dec. 1921] (Bz--25454); Boschproefst. 2197 (K, Le); Collector indig. 7 (Cl), 16 (Ut--21031); Collector undesignated s.n. [Java] (Le); F. C. Faber s.n. [Rigi] (Mu--4324); H. Hallier s.n. [12-11-1894] (Le); Herb. Blume s.n. (Le); Herb. Bogor. 16868 (Bz); Hillebrand s.n. (B, B, B, B); Horsfield 27 (Bm), s.n. (Bm, K); Jeswiet s.n. [1916] (Ut); Karsten 1 (Le); Koorders 9694b (Le), 9695b (Le), 9696b (Cl, Le), 20022 (Le), 22009b (Cl), 24112b (B, Bz--25449, Le), 27613b (B, Le, P, X); Kuntze 5921, in part (K, N); Möller s.n. [2.1897] (S, S); Schins 1 (Le); Wolff von Wülffing W.64 (Bz--16904); Zippelius s.n. (Le); Zollinger 2969 (B, Bm, Cb, Cb, Cb, P, S, X). BRITISH NORTH BORNEO: Elmer 21250 (B, Bm, Br, Bz--16847, Ca--312132, Cb, Cp, Du--176072, E--959207, F--567366, Mu, N, P, S, Ut); Tahir 1232 (K). SARAWAK: Beccari 1770 (B, K, P); Foxworthy 292 (W--713265); Haviland & Hose 3268 (K), 3268b (Bm). BORNEO: Boschwezen 1974 (Bz--16848, Bz--16849, Ca--227874, Le); Collector undesignated 5a (Bz--16854); Draaisma 67 [Boschproefst. BB.7983] (Bz--16852, Bz--16853); Haviland 641 (K), 3268 (Cl), s.n. (Cl); Jong 478 [Boschproefst. BB.8293] (Bz--16832); Laboim 1964 (Bz--16850, Bz--16851); Motley 1275 (K); Oroflo 690 (N); Van Neurs 17 [Samarinda 93; Boschproefst. BB.9339] (Bz--17231, Bz--17232). CELEBES: Barclay s.n. [Macassar, 1840] (Bm); Boschproefst. CC.14440 (Le, P); Kjellberg 2576 (S); Rachmat 357 (Le); Teijsmann 13766 (Bz--16940, Bz--16941, Le, Le). LESSER SUNDA ISLANDS: Bali: Becking 39 (Le). Banka: Teijsmann s.n. (Bz--16955). Timor: Collector undesignated s.n. [Timor] (Cp); Herb. Mus. Paris s.n. [Timor] (Cb). MOLUCCA ISLANDS: Ceram: Buwalda 617 [Boschproefst. BB.25962] (Bz--16840). NEW GUINEA: Dutch New Guinea: Lundquist 213 [Boschproefst. BB.32932] (Bz--72945), 215 [Boschproefst. BB.32934] (Bz--72946); Salverda 32 [Boschproefst. BB.21827] (Bz--16844), 46 [Boschproefst. BB.21840] (Bz--16846); Teijsmann 7459 (Cp, K, Le). Northeastern New Guinea: Mair 1808 (Ng--6497); Moszkowski 177 (B, B). Papua: Brass 28889 (S); Hellwig 212 (B, K); Hoogland 4184 (Cb, Ng--16831, Ng); Schacht 2777 (Ng--6498); L. S. Smith 1370 (Ng--6495). BISMARCK ARCHIPELAGO: New Ireland: Peckel 201 (Bz--17240). SOLOMON ISLANDS: Island undetermined: Kusche s.n. [Nov. 1--Dec. 28, 1920] (Gg--34494). AUSTRALIA: Northern Territory: N. Holtze s.n. [vicinity of Port Darwin] (Cm). Queensland: Wilhelmi s.n. [Rockhampton] (V). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated s.n. (Ut--43826); Kapadia 48 [Sewari] (Cp). MOUNTED ILLUSTRATIONS: Lam., Illustr. pl. 540 (B).

AVICENNIA ALBA var. LATIFOLIA Moldenke, Geogr. Distrib. Avicenn.

34, nom. nud. (1939); Phytologia 1: 410—411. 1940.

Literature: Domin, Bibl. Bot. 89 (6): 1116. 1928; Moldenke, Geogr. Distrib. Avicenn. 34. 1939; Moldenke, Phytologia 1: 410—411. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 65 & 86 (1942) and [ed. 2], 146, 147, & 174. 1949; Moldenke, Alph. List Cit. 3: 773 (1949) and 4: 1097. 1949; Moldenke, Phytologia 4: 193, 195, & 196. 1953; Moldenke, Résumé 187, 194, & 440. 1959.

This variety differs from the typical form of the species in its mature leaf-blades being broadly elliptic, to 6.5 cm. wide.

The type of the variety was collected by Noerkas (no. 58) on the Van Vuuren Expedition at Kap Wadjo, Celebes, and is deposited in the Rijksherbarium at Leiden. Some Banks and Borneo specimens cited by me under A. alba Blume have leaves that approach this.

Domin, in the work cited above, refers to a collection of his from Stradbroke Island, Queensland, made in March, 1910, as "eine sehr breitblättrige Form." I have not as yet seen this collection; it may possibly represent var. latifolia.

In all, 7 herbarium specimens, including the type, and 3 mounted photographs have been examined.

Citations: SUMATRA: Boschwezen 85 [Koorders 10592b] (Bz--16953, Bz--16954). CELEBES: Noerkas 58 (Bz--16934--isotype, Bz--16935--isotype, Bz--16936--isotype, E--photo of type, Le--type, N--isotype, N--photo of type, Z--photo of type).

AVICENNIA BALANOPHORA Stapf & Moldenke ex Moldenke, Geogr. Distrib. Avicenn. 34, nom. nud. (1939); Phytologia 1: 409—410, 1940.

Synonymy: Avicennia balanophora Ridl., Dispersal Pl. 310, nom. nud. 1930. Avicennia balanophora Moldenke apud E. J. Salisb., Ind. Kew. Suppl. 10: 26. 1947.

Literature: MacGillivray, Narr. Voy. Rattlesnake Bot. 212. 1852; Ridl., Dispersal Pl. 310. 1930; Moldenke, Geogr. Distrib. Avicenn. 34. 1939; Moldenke, Phytologia 1: 409—410. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 69 & 86. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 26. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 152 & 174. 1949; Moldenke, Alph. List Cit. 3: 721 & 752. 1949; Moldenke, Résumé 207 & 440. 1959; Moldenke, Résumé Suppl. 1: 14 & 15. 1959.

Small tree; branchlets and twigs very slender, subterete, densely grayish-farinaceous, becoming glabrous in age, obscurely or not at all lenticellate; nodes swollen, annulate, articulate; principal internodes 2.8—6.5 cm. long; leaves decussate-opposite; petioles rather slender, 0.8—2 cm. long, densely pulverulent-puberulent with gray or yellowish hairs, flattened above, wrinkled longitudinally beneath in drying, slightly amplexate at the base; leaf-blades firmly chartaceous or subcoriaceous, dark-green and rather shiny above, incanous or flavidous beneath, lanceolate or narrowly elliptic, 2.5—9.3 cm. long, 6—24 mm. wide, varying from acute (on young leaves) to long-acuminate or caudate (on mature ones) at the apex, entire, attenuate or long-acuminate into the petiole at the base, very obscurely fine-

pulverulent or glabrate above, very densely pulverulent-puberulent and incanous or flavidous beneath; midrib slender, slightly prominulent above and usually canaliculate to the apex or to $1/2$ or $3/4$ the length from the base, rounded-prominulent beneath; secondaries very slender, ascending, slightly prominulent on both surfaces, arcuately joined in many loops at the margins, mostly obscure beneath; vein and veinlet reticulation sparse, the larger portions subprominulent on both surfaces, mostly obscure or hidden beneath; inflorescence axillary and terminal, the axillary ones solitary or paired, capitate, 1.4--5 cm. long, 5--19 mm. wide, several-flowered, the terminal one often 3-branched at the apex and there conspicuously bracteate; bracts, when present, foliaceous, very narrowly elliptic, short-stipitate or sessile, 17--25 mm. long, 4--6 mm. wide, densely pulverulent-puberulent with incanous or flavidous furf on both surfaces, acute at the apex, attenuate or acuminate at the base; flowers small, the corollas about 6 mm. wide during anthesis; fruiting-calyx practically unchanged, densely short-pubescent, its segments and the similar bractlets and prophylla mostly brown-margined, closely appressed to the base of the fruit; fruit oblong, acorn-like, 6--8 mm. long, 4--4.5 mm. wide, rounded at both ends, very densely puberulent with grayish-flavidous hairs, apiculate at (usually) the exact center above.

The type of this species was collected by Baron Ferdinand von Mueller along the Brisbane River, Queensland, Australia, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The collector says "This is not the species from Bass Straits or from St. Vincent Gulf! I shall give an account of this plant hereafter." However, I cannot find that Mueller ever did get around to describing this plant. The species was found again by John MacGillivray on Keppel's Islands, Queensland, on December 2, 1847. The species was regarded as *A. officinalis* L. by Bentham, but Stapf recognized it as undescribed, named it, but never validly published it as far as I can ascertain. In all, 3 herbarium specimens, including the type, and 5 mounted photographs have been examined.

Citations: AUSTRALIA: Queensland: MacGillivray s.n. [Keppels Isles] (K, Mi--photo, N, N--photo, Z--photo); F. Mueller s.n. [Brisbane River] (K--type, N--photo of type, Z--photo of type)

AVICENNIA BICOLOR Standl., Journ. Wash. Acad. Sci. 13: 354. 1923.

Literature: Standl., Journ. Wash. Acad. Sci. 13: 354. 1923; J. A. Clark, Card Index issue 101. 1924; Hill, Ind. Kew. Suppl. 7: 23. 1929; Moldenke, Geogr. Distrib. Avicenn. 16 & 17. 1939; Moldenke, Alph. List Common Names 20. 1939; Calderón & Standl., Fl. Salvad., ed. 2, 235. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 21, 23, & 86. 1942; Moldenke, Phytologia 2: 92. 1944; Moldenke, Alph. List Cit. 1: 9 (1946), 2: 530 & 571 (1948), 3: 784 & 818 (1949), and 4: 1036, 1046, & 1133. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28, 38--40, & 174. 1949; Cuatrecasas, Bol. Soc. Bot. Mex. 23: 94. 1958; Moldenke, Résumé 34, 45--47, 49, & 440. 1959.

Shrub or tree, to 13 m. tall; trunk to 25 cm. in diameter; young branchlets glabrous; petioles very stout, 4--15 mm. long; leaf-blades broadly elliptic to elliptic-ovate or oval-ovate, 7--13 cm. long, 3.5--7 cm. wide, rounded or obtuse at the apex, entire, obtuse at the base and usually abruptly short-decurrent, glabrous and lustrous above and with prominent venation, densely covered with a minute whitish tomentum beneath; inflorescence spicate, opposite, the rachis elongate and the pairs of individual flowers 5--8 mm. distant from each other, the spikes numerous, forming lax panicles 5--17 cm. long, the branches of the panicle minutely tomentose; bracts and bractlets rounded, obtuse at the apex, tomentulose; corolla about 4 mm. long, its tube glabrous, the lobes obovate, subtruncate at the apex, sericeous on the outer surface, glabrous within; style nearly obsolete.

The type of this very distinct species was collected by Henri François Pittier de Fábrega (no. 4968) in a mangrove swamp at Aguadulce, Coclé, Panama, on December 5, 1911, and is deposited in the United States National Herbarium at Washington. It has been collected in anthesis also in January. The common name "mangle negro" is recorded for it by Calderón & Standley in the reference cited above. This name is also applied to A. germinans (L.) Stearn. The same authors say that the salt exuded by the leaves of A. bicolor is called "madre-sal".

In all, 21 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: MEXICO: Chiapas: Matuda 16353 (W--1889845). EL SALVADOR: Ahuachapán: Padilla 333 (W--1084693, W--1084694). COSTA RICA: Guanacaste: J. T. Howell 10242 (Gg--272324). PANAMA: Canal Zone: Heriberto 206 (N, W--1084422). Coclé: H. Pittier 4968 (Bm--isotype, Cp--isotype, F--636788--isotype, K--isotype, N--isotype, N--photo of type, N--photo of isotype, P--isotype, W--715141--isotype, W--715142--type, Z--photo of type, Z--photo of isotype). Province undetermined: Andersson s.n. [April, 1852] (S, S, S); R. S. Williams 78 [Porto Pasada] (N).

AVICENNIA EOCENICA Berry, U. S. Geol. Surv. Prof. Paper 91: 347, pl. 104, fig. 6. 1916.

Literature: Berry, U. S. Geol. Surv. Prof. Paper 91: 347, pl. 104, fig. 6. 1916; Knowlton, U. S. Geol. Surv. Bull. 696: 108. 1919; Moldenke, Geogr. Distrib. Avicenn. 41. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 75 & 86. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 42. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 166 & 174. 1949; Moldenke, Résumé 226 & 440. 1959.

Illustrations: Berry, U. S. Geol. Surv. Prof. Paper 91: pl. 104, fig. 6. 1916.

Twigs, leaves, and flowers not known; fruit capsular, ovate, slightly oblique in outline, widest in the median portion and narrowing almost equally in both directions, truncate proximad, shortly apiculate distad, greatly compressed, 2.7 cm. long, about 1.35 cm. wide; pericarp thin, coriaceous, feebly ridged with 2 or

3 slight longitudinal elevations, longitudinally striate.

The type of this species was collected by Edward Wilber Berry in the Lagrange formation, in beds of Wilcox (Eocene) age, at Puryear, Henry County, Tennessee, and is deposited in the United States National Museum at Washington. According to Berry "The identification of the present form with the capsule of Avicennia is not conclusively proved, although the resemblance between the fossil and a single valve of the tardily dehiscent capsule of such a modern form as A. nitida Jacquin amounts as nearly to proof as is possible with detached parts of fossil vegetation, especially as Avicennia-like leaves are also present at this horizon. This form is slightly smaller and more nearly symmetric than a valve of a capsule of the black mangrove; otherwise the resemblance is complete. It is possible that the Wilcox species of Citharexylon [C. eoligniticum] based on foliage may be the foliage of Avicennia eocenica, although the form appears to be more closely allied with Citharexylon."

AVICENNIA EUCALYPTIFOLIA Zipp. ex Miq., Fl. Ned. Ind. 2: 912, in syn. (1856); Ridl., Dispersal Pl. 310, nom. nud. (1930), sp. nov.

Synonymy: Avicennia officinalis var. eucalyptifolia Valet., Bull. Dep. Agric. Ind. Néerl. 10: 53. 1907. Avicennia alba Karst. ex Valet., Bull. Dep. Agric. Ind. Néerl. 10: 53, in syn. 1907 [not A. alba Blume, 1826, nor Wight, 1921]. Avicennia alba var. acuminatissima Merr., Philip. Journ. Sci. Bot. 11: 311. 1916. Avicennia officinalis var. acuminata Domin, Bibl. Bot. 89 (6): 1116. 1928.

Literature: Miq., Fl. Ned. Ind. 2: 912. 1856; Valet., Bull. Dep. Agric. Ind. Néerl. 10: 53. 1907; Pulle in Lorentz, Nova Guinea 8: 403. 1910; Prain, Ind. Kew. Suppl. 4: 21. 1913; Merr., Philip. Journ. Sci. Bot. 11: 311. 1916; H. J. Lam, Verbenac. Malay. Arch. 341--343 & 361, pl. 3, L, P, Q, R, S, T, & U. 1919; Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 203, pl. 16, fig. b & c. 1921; Domin, Bibl. Bot. 89 (6): 1116. 1928; Ridl., Dispersal Pl. 310. 1930; Moldenke, Geogr. Distrib. Avicenn. 33--35. 1939; Moldenke, Prelim. Alph. List Invalid Names 5 & 6. 1940; Moldenke, Alph. List Invalid Names 5. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 61, 63, 66, 67, 69, 70, & 86. 1942; Moldenke, Alph. List Cit. 1: 13, 16, 34, 57, 115, 141, 191, 270, & 316 (1946), 2: 403, 412, 449, 603, & 617 (1948), 3: 752, 776, 823, 858, 902, 906, 912, 952, & 969 (1949), and 4: 985, 1021, 1037, 1083, 1093, 1105, 1110, 1148, & 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 140, 143, 147, 148, 152, 155, 156, & 174. 1949; Moldenke, Phytologia 3: 381 & 382 (1950), 4: 86 & 87 (1952), and 4: 195 & 197. 1953; Moldenke, Résumé 182, 187, 196, 198, 200, 202, 203, 207, 211, 235, 236, & 440. 1959; Moldenke, Résumé Suppl. 1: 13 & 14. 1959.

Illustrations: H. J. Lam, Verbenac. Malay. Arch. pl. 3, L, P, Q, R, S, T, & U [as A. officinalis]. 1919; Bakh., Bull. Jard. Bot.

Buitenz., sér. 3, 3: pl. 16, figs. b & c [as A. marina var. resinifera]. 1921.

Arbor, foliis lanceolatis vel anguste lanceolatis, 4--16 cm. longis, 1--4.2 cm. latis, ad apicem longe attenuato-acuminatis vel caudatis, ad basin acutis vel acuminatis usque ad attenuatis supra glabris nitidisque et impresso-punctatis, subtus dense albo-pulverulentis.

Tree, to 16.5 m. tall; pneumatophores to 15 cm. tall; trunk generally with a small bole or the latter to 1.5 m. high, not straight, to 46 cm. in diameter at breast height; branches rather stout, obtusely tetragonal; bark smooth, greenish-gray or gray-brown to green-blue or grayish-green, peeling off in thin flakes, 1 mm. thick, the under bark pale-brown, the inner bark straw-colored; wood straw-colored or white; branchlets and twigs slender, numerous, gray, acutely or obtusely tetragonal, articulate, densely whitish- or grayish-pulverulent or subglabrate in age; nodes swollen, distinctly annulate; principal internodes 1.3--4.6 cm. long; leaf-scars small and inconspicuous, not corky; leaves decussate-opposite; petioles slender, 5--12 mm. long, densely white- or gray-pulverulent, flattened but usually not sulcate above, convex beneath, sometimes slightly wrinkled in drying, very slightly or not at all ampliate at the base; leaf-blades firmly chartaceous or subcoriaceous, light- to dark-green or brownish-green above, gray or grayish beneath, slightly shiny or glossy above, lanceolate or narrow-lanceolate, 4--16 cm. long, 1--4.2 cm. wide, 3--5 times as long as wide, long attenuate-acuminate or caudate at the apex, rarely merely acute, entire, very slightly revolute along the margins in drying, acute or acuminate to attenuate at the base, glossy-glabrous and impressed-punctate above, densely whitish- or grayish-pulverulent beneath; midrib slender, flattened or slightly prominent to the apex above, usually canaliculate for one-half to three-quarters its length from the base, rounded-prominent or somewhat flattened and canaliculate toward the base beneath; secondaries slender, 6--12 per side, arcuate-ascending, only very slightly prominent on both surfaces or obscure beneath, joined rather indistinctly in many loops at the margins, the collective vein usually rather indistinct; vein and veinlet reticulation sparse, the larger portions slightly prominent above, mostly obscure beneath; inflorescence axillary and terminal, capitate or subspicate, 1--2.5 cm. long, 4--12 mm. wide, 2--7-flowered, the flowers usually densely congested, decussate-opposite, the axillary inflorescence confined to the 1--3 upper axils, 1 or 2 per axil, sometimes borne on very short axillary twigs; peduncles mostly sharply tetragonal, densely grayish-pulverulent, 6--21 mm. long; bracts usually numerous, foliaceous, lanceolate, mostly more or less falcate-recurved, very decidedly revolute with the edges curled in to the midrib, densely grayish-pulverulent on both surfaces, stipitate, sometimes reduced, 0.8--6 cm. long; calyx pale-green; corolla white or yellow to "orange, in older flowers with purplish tips"; stamens deep-purple or brown; ovary orange-yellow; fruiting-calyx deeply 5-parted almost to the base, the lobes erect, ovate, about

5 mm. long, about 2 mm. wide at the base, densely strigose-puberulent on the outer surface, the margins fringed, acute at the apex, glabrous on the inner surface, imbricate in cupuliform fashion; fruit ovate or somewhat cordate, 1--3 cm. long, 0.5--2.2 cm. wide, beaked at the apex, densely grayish-pulverulent.

Brass describes this species as a "large tree mangrove, often above the tide mark". It has been found at the edges of tidal areas, on rocky coral shores, in the muddy parts of sea lagoons, and in clayey soil of mangrove forests. Hoogland says that it forms pure stands in the inner zone of the mangroves, at an altitude of 1 meter. It has been collected in anthesis in April, June, August, September, November, and December, and in fruit in January. Herbarium material has been widely confused with and misidentified as A. alba Blume, A. marina var. resinifera (Forst.) Bakh., and A. officinalis L.

Brass, on the label of his no. 21841, described the flowers as "brown", while Floyd & Gray state that the flowers are borne "in short axillary cymes". Vernacular names recorded for the species are "bibi", "biobio", "bu-bula", "jaafjaaf", "moro", "pa xi", and "pipin". The Koch s.n. [Meranke] collection is a mixture with A. marina var. resinifera.

The type of A. alba var. acuminatissima was collected by Charles Budd Robinson (no. 1862) on Amboina, while the type of A. officinalis var. acuminata is an unnumbered collection made by Domin in the vicinity of the mouth of the Russell River in northeastern Queensland, Australia, in January, 1910. Domin describes the plant well when he says "Excellit foliis elongatis, anguste lanceolatis, longe sensim tenuiter acuminatis usque ad 16 cm. longis sed tantum 2.3 cm. latis.....durch die Blattform sehr auffallend!"

Valeton based his A. officinalis var. eucalyptifolia on the Zippelius a.n. and Spanoghe s.n. collections in the Leiden and Paris herbaria [the Zippelius 87, cited below, may possibly be part of one of these cotype collections]. He gives the name "Avicennia eucalyptifolia Zipp., in herb." in synonymy. Pulle (1910) accepts Valeton's trinomial. Prain (1913) lists "A. eucalyptifolia" as a synonym of A. officinalis L.

It is worthy of note here that the Low Island on which this species has been collected is located in the Great Barrier Reef off the coast of Queensland, and is not in Tasmania as cited by me in my Geogr. Distrib. Avicenn. 35 (1939). The Sumatra record for this species as given by me in previous publications was based on the Conservatoire et Jardin Botanique, Geneva, sheet of Yates 1110, which I now feel is A. alba.

In all, 92 herbarium specimens, including the type collections of most of the names involved, and 11 mounted photographs have been examined.

Citations: PHILIPPINE ISLANDS: Mindanao: Elmer 11990, in part (Cb, Cl, Ed, Le, V, W--779701). LESSER SUNDA ISLANDS: Timor: Baudin s.n. (Cb); Collector undesignated s.n. [Muséum de Paris,

1821] (De); Herb. Jussieu s.n. (S); Herb. Lugd.-Bat. 908267-918 (Le); Herb. Mus. Paris. 23 (Le), s.n. [1836] (K); Karsten 2 (Le); Schins 2 (Le); Spanoghe s.n. (Le-908265-613-cotype); Zippelius s.n. (Le-908265-623-cotype, Le-cotype). MOLUCCA ISLANDS: Amboina: C. B. Robinson 1862 (B, Bm, Bz-17059, Cl, F-478619, K, Le, N-photo, P, S-photo, W-775248, Z-photo). Taninber Islands: Buwalda 115 [Boschproefst. BB.24334] (Bz-16841). NEW GUINEA: Dutch New Guinea: Branderhorst 227 (B, K, Le, Ut); J. W. R. Koch s.n. [8/10/1904] (Le, Le), s.n. [Meranke] (Bz-17069, in part); Lundquist 95 (Bz-16842); Salverda 18 [Boschproefst. BB.22097] (Bz-16845), 29 [Boschproefst. BB.21824] (Bz-16843); Stefels B. W. 3199 (Ng-20203, Ng); Versteeg 1893 (B, Bz-17067, Bz-17068, K, Le, Mi-photo, N-photo, Ut, Ut, Z-photo); Zippelius 87 [87d] (Le). Papua: Bauerlen 606 (Mb); Brass 794 (B, Bz-17064, K, P), 882 (B, I-photo, K, N, N-photo, P, Z-photo), 21841 (Ng-17093); Cavanaugh 11 (Ng-6496); Chalmers s.n. [Port Moresby, 1880] (Mb); Hoogland 4699 (Cb, Ng-16826); J. C. Saunders 139 (Ng-16824); Waterhouse 342 [Yale Herb. 29467] (N). URAMU ISLAND: Floyd & Gray 8005 (Ng-16891, Ng). AROE ISLANDS: Wamar: Buwalda 5579 (Bz-72565). LOUISIADE ARCHIPELAGO: Heigh: W. MacGregor s. n. [1889] (Mb, N). KRAKA ISLAND: Aet 173 (Bz-72564, Er). SOLOMON ISLANDS: Malaita: Kajewski 2344, in part (Bm). AUSTRALIA: North-ern Territory: Armstrong 515 (K, K); Herb. Torrey s.n. (T); Rich. Schomburgk s.n. [North Australia] (Br); F. Schultz 593 (B, K, N-photo, Z-photo). Queensland: F. M. Bailey s.n. [Brisbane River] (W-59281); Daemel s.n. [Cape York] (Bm, V); Michael 724 (Bm); F. Mueller s.n. [Dec. '55] (K), s.n. [Queensland] (C); Podenzana s.n. [Cooktown, 1891-1893] (Bm); Warburg 18756 (B). State undetermines: Oldfried s.n. [1866] (X). LOW ISLAND: Tandy 542 (Bm). WOODY ISLAND: T. A. Stephenson 605 (Bm). SPURS ISLAND: Henne s.n. (K, N-photo, X, Z-photo). HOWICK GROUP ISLANDS: F. Mueller s.n. (K). THURSDAY ISLAND: Podenzana s.n. [Thursday Isl.] (Bm).

AVICENNIA GERMINANS (L.) Stearn, Kew Bull. 1958: 34-36. 1958.

Synonymy: Mangle laurocerasi foliis flore albo tetrapetalo Sloane, Voy. Jamaic. 2: 66. 1725. Bontia ? foliis integris oblongis oppositis, petiolis crassis brevissimis subamplexantibus, floribus racemosis P. Browne, Civil & Nat. Hist. Jamaic., ed. 1, 263. 1756. Donatia Loefl., Iter Hisp. 133. 1758. Bontia germinans L., Syst. Nat., ed. 10, 2: 1122. 1759. Avicennia nitida Jacq., Enum. Syst. Pl. Carib. 25. 1760 [not A. nitida Blanco, 1837]. Avicennia tomentosa Jacq., Enum. Syst. Pl. Carib. 25. 1760 [not A. tomentosa Blanco, 1845, nor Blume, 1918, nor R. Br., 1851, nor L., 1826, nor Roxb., 1835, nor Schau., 1940, nor Vahl, 1921, nor Willd., 1800]. Avicennia nitida L. & Jacq. ex Lam., Tabl. Encycl. Méth. Bot. 1: 330. 1783. Avicennia tomentosa L. & Jacq. ex Lam.,

Tabl. Encycl. Méth. Bot. 1: 330. 1783. Bontia germinans Mill. ex Lam., Tabl. Encycl. Méth. Bot. 1: 330, in syn. 1783. Avicennia tomentosa var. cumanensis H.B.K., Nov. Gen. & Sp. Pl., ed. fol., 2: 229, & ed quart. 283. 1818. Avicennia tomentosa var. campechensis H.B.K., Nov. Gen. & Sp. Pl., ed. fol., 2: 229--230, & ed. quart. 284. 1818. Avicennia tomentosa var. guayaquilensis H.B.K., Nov. Gen. & Sp. Pl., ed. fol., 2: 230, & ed. quart. 284. 1818. Avicennia tomentosa G. F. W. Mey., Prim. Fl. Esseq. 221. 1818. Avicennia elliptica Holm in Thunb., Pl. Bras. Dec. 3: 37. 1821. Avicennia tomentosa Nutt. & Br. ex Raf., Atl. Journ. 148, in syn. 1832. Avicennia floridana Raf., Atl. Journ. 148. 1832. Avicennia tomentosa Sieber (in part) ex Presl, Bot. Bemerk. 98--99, in syn. 1844. Avicennia meyeri Miq., Linnaea 18: 262. 1844. Avicennia nitida Rodsch. ex Miq., Linnaea 18: 262, in syn. 1844. Avicennia lamarckiana Presl, Bot. Bemerk. 99. 1844. Avicennia elliptica Thunb. ex Schau. in A. DC., Prodr. 11: 700, in syn. 1847. Avicennia oblongifolia Nutt. ex A. W. Cham., Fl. South. U. S. 310. 1860. Avicennia tomentosa Sw. apud Griseb., Fl. Brit. West Ind. 502, in syn. 1864. Avicennia officinalis α nitida (Jacq.) Kuntze, Rev. Gen. Pl. 2: 502. 1891. Avicennia officinalis β lanceolata Kuntze, Rev. Gen. Pl. 2: 502. 1891. Avicennia nitida Sessé & Moc., Fl. Mex., ed. 2, 142--143. 1894. Hilairanthus nitidus (Jacq.) Van Tiegh., Journ. de Bot. 12: 357. 1898. Hilairanthus tomentosus (Jacq.) Van Tiegh., Journ. de Bot. 12: 357. 1898. Avicennia floridana Gandoger, Bull. Soc. Bot. France 65: 64. 1918. Avicennia germinans L. apud Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 218, in syn. 1921. Avicennia officinalis Millsp. apud Standl., Field Mus. Publ. Bot. 3: 399, in syn. 1930 [not A. officinalis L., 1753, nor H. J. Lam, 1940, nor Maxim., 1932, nor Schau., 1856]. Avicennia papulosa Ørst. ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Avicennia americana Nutt. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940. Avicennia angustifolia Hornem. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940. Avicennia officinalis var. lanceolata Kuntze ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Avicennia nitida Jacq. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940. Avicennia officinalis var. nitida (Jacq.) Kuntze ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Avicennia tomentosa var. campechiensis H.B.K. ex Moldenke in Pulle, Fl. Surin. 4 (2): 323, in syn. 1940. Bontia foliis oppositis, pedunculis spicatis L. ex Moldenke, Prelim. Alph. List Invalid Names 7, in syn. 1940. Bontia folius subtus tomentosus Jacq. ex Moldenke, Prelim. Alph. List Invalid Names 7, in syn. 1940. Bontia laurocerasi foliis, etc. Sloane ex Moldenke, Prelim. Alph. List Invalid Names 7, in syn. 1940. Lippia glauca

Rose ex Moldenke, Prelim. Alph. List Invalid Names 31, in syn. 1940. Mangle laurocerasifolius, etc. Sloane ex Moldenke, Prelim. Alph. List Invalid Names 32, in syn. 1940. Avicennia nitida Jacq. ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Avicennia nitida var. angustata Forsström ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Avicennia tomentosa var. acutifolia Blanchet ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Auicennia nitida Jacq. ex Moldenke, Alph. List Invalid Names 5, in syn. 1942. Auicennia nitida Sessé & Moc. ex Moldenke, Alph. List Invalid Names 5, in syn. 1942. Avicennia tomentosa Jack apud Stellfeld, Arquiv. Mus. Paran. 4: 239, sphalm. 1945. Avicennia officinalis nitida Kuntze ex Roig, Plant. Med. Cub. 449, in syn. 1945. Avicennia tomentosa Nutt. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947. Avicennia nitida L., in herb. Avicenuia tomentosa L., in herb.

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NOTES ON BROMELIACEAE, XIV

Lyman B. Smith

TROPICAL AMERICA

REALIGNMENTS IN THE PITCAIRNIOIDEAE

Thanks to the courtesy of a loan from Professor Merxmüller of the Botanisches Staatssammlung of München, it has been possible to verify the characters of Cottendorfia florida Schult. f., the type species of the genus. This in turn has led to a re-examination of the relationship between Cottendorfia and Lindmania Mez, with the unexpected discovery that Lindmania consists of two genera, the typical one of which is not separable from Cottendorfia. Typical Lindmania, which is native of the Guayana Highland of southern Venezuela, has the short basal placentae supposedly distinctive of Cottendorfia and in addition shares with it the new character of versatile anthers. The remainder of Lindmania, which is found from Mexico to Argentina, has placentae extending most of the height of the locule and basifixed anthers. It constitutes a new genus. The resulting taxonomy and nomenclature are as follows:

Anthers versatile; filaments usually free; leaf-blades firm, not contracted at base; scape developed or wanting; inflorescence rarely tripinnate; heliophytic species of northeastern Brazil and the Guayana Highland.....COTTENDORFIA
Anthers basifixed; inner filaments adnate to base of petals; leaf-blades thin, more or less contracted at base; scape always developed; inflorescence often tripinnate; mesophytic species ranging from Mexico to Argentina.....FOSTERELLA

COTTENDORFIA Schult. f.

Cottendorfia Schult. f. in Roem. & Schult. Syst. 7, pt. 2: lxiv, 1193. 1830. Type species: C. florida Schult. f.

Lindmania Mez in DC. Monogr. Phan. 9:535. 1896. Type species: L. guianensis (Beer) Mez (Anoplophytum guianense Beer).

COTTENDORFIA ARGENTEA (L. B. Smith) L. B. Smith, comb. nov.

Lindmania argentea L. B. Smith, Mem. New York Bot. Gard. 9:414, fig. 78. 1957.

COTTENDORFIA BRACHYPHYLLA (L. B. Smith) L. B. Smith, comb. nov.

Lindmania brachyphylla L. B. Smith, Mem. New York Bot. Gard. 9:416, fig. 80. 1957.

COTTENDORFIA CYLINDROSTACHYA (L. B. Smith) L. B. Smith, comb. nov.

Lindmania cylindrostachya L. B. Smith, Mem. New York Bot. Gard. 9:286, fig. 15. 1957.

COTTENDORFIA FLORIDA Schult. f. in Roem. & Schult. Syst. 7, pt.

2:1193. 1830.

COTTENDORFIA GENICULATA (L. B. Smith) L. B. Smith, comb. nov.
Lindmania geniculata L. B. Smith, Mem. New York Bot. Gard. 9:414,
fig. 79. 1957.

COTTENDORFIA GUIANENSIS (Beer) Kl. ex Baker, Handb. Bromel. 129.
1889.
Anoplophytum guianense Beer, Bromel. 44. 1857.
Tillandsia parviflora sensu C. Koch, Ind. Sem. Hort. Berol. 1873,
App. 4:3. 1874. Not R. & P. 1802.
Lindmania guianensis (Beer) Mez in DC. Monogr. Phan. 9:537. 1896.

COTTENDORFIA MINOR (L. B. Smith) L. B. Smith, comb. nov.
Lindmania minor L. B. Smith, Mem. New York Bot. Gard. 9:419, fig.
85. 1957.

COTTENDORFIA NAVIOIDES (L. B. Smith) L. B. Smith, comb. nov.
Lindmania navioides L. B. Smith, Mem. New York Bot. Gard. 9:419,
fig. 86. 1957.

COTTENDORFIA PALUDOSA (L. B. Smith) L. B. Smith, comb. nov.
Lindmania paludosa L. B. Smith, Mem. New York Bot. Gard. 9:284,
fig. 14. 1957.

COTTENDORFIA PHELPSIAE (L. B. Smith) L. B. Smith, comb. nov.
Lindmania phelpsiae L. B. Smith, Mem. New York Bot. Gard. 9:286,
fig. 16. 1957.

COTTENDORFIA SERRULATA (L. B. Smith) L. B. Smith, comb. nov.
Lindmania serrulata L. B. Smith, Contr. U. S. Nat. Herb. 29:283,
fig. 8. 1949.

COTTENDORFIA SERRULATA var. REDUCTA (L. B. Smith) L. B. Smith,
comb. nov.
Lindmania serrulata var. reducta L. B. Smith, Mem. New York Bot.
Gard. 9:414. 1957.

COTTENDORFIA STENOPHYLLA (L. B. Smith) L. B. Smith, comb. nov.
Lindmania stenophylla L. B. Smith, Mem. New York Bot. Gard. 9:
417, fig. 84. 1957.

COTTENDORFIA STEYERMARKII (L. B. Smith) L. B. Smith, comb. nov.
Lindmania steyermarkii L. B. Smith, Mem. New York Bot. Gard. 9:
416, fig. 81. 1957.

COTTENDORFIA SUBSIMPLEX (L. B. Smith) L. B. Smith, comb. nov.
Lindmania subsimplex L. B. Smith, Mem. New York Bot. Gard. 9:417,
fig. 83. 1957.

COTTENDORFIA THYRSOIDEA (L. B. Smith) L. B. Smith, comb. nov.
Lindmania thyrsoides L. B. Smith, Mem. New York Bot. Gard. 9:287,

fig. 17. 1957.

COTTENDORFIA TILLANDSIOIDES (L. B. Smith) L. B. Smith, comb. nov.
Lindmania tillandsioides L. B. Smith, Mem. New York Bot. Gard. 9:
416, fig. 82. 1957.

COTTENDORFIA WURDACKII (L. B. Smith) L. B. Smith, comb. nov.
Lindmania wurdackii L. B. Smith, Mem. New York Bot. Gard. 9:284,
fig. 13. 1957.

FOSTERELLA L. B. Smith, gen. nov.

Terrestris, acaulis; foliis rosulatis, integris vel serrulatis, laminis basi plus minusve attenuatis; scapo elongato, erecto; inflorescentia plerumque laxa paniculata, saepe tripinnata; floribus parvis, homomorphis, hermaphroditis; sepalis liberis; petalis liberis, nudis, sepala multo superantibus, plerumque albis; staminibus interioribus cum petalis brevissime connatis; antheris linearibus, basifixis; ovario omnino supero, glabro; placentis elongatis; stylo gracillimo; capsula septicide vel loculicide dehiscente; seminibus bicaudatis. Type species: F. micrantha (Lindl.) L. B. Smith (Pitcairnia micrantha Lindl.) Pl. I.

This new genus is dedicated to Mulford B. Foster, discoverer extraordinary of new species of Bromeliaceae.

FOSTERELLA ALBICANS (Griseb.) L. B. Smith, comb. nov.
Cottendorfia albicans Griseb. Symb. Argent. in Goett. Abh. 24:
330. 1879.
Lindmania albicans (Griseb.) Mez in DC. Monogr. Phan. 9:537.
1896.

FOSTERELLA ALETROIDES (L. B. Smith) L. B. Smith, comb. nov.
Lindmania aletroides L. B. Smith, Contr. U. S. Nat. Herb. 29:530,
fig. 86. 1954.

FOSTERELLA GRACILIS (Rusby) L. B. Smith, comb. nov.
Catopsis gracilis Rusby, Bull. New York Bot. Gard. 6:489. 1910.
Lindmania gracilis (Rusby) L. B. Smith, Contr. Gray Herb. 104:78.
1934.

FOSTERELLA GRAMINEA (L. B. Smith) L. B. Smith, comb. nov.
Lindmania graminea L. B. Smith, Lilloa 14:93, figs. 1-4. 1948.

FOSTERELLA MICRANTHA (Lindl.) L. B. Smith, comb. nov.
Pitcairnia micrantha Lindl. Bot. Reg. 29: Misc. 44. 1843.
Cottendorfia neogranatensis Baker, Handb. Bromel. 129. 1889.
Lindmania neogranatensis (Baker) Mez in DC. Monogr. Phan. 9:538.
1896.
Lindmania flaccida Standley, Journ. Washington Acad. Sci. 13:364.
1923.

Pl. I, fig. 1: Mexia 9187a, habit x 2/5; fig. 2: Flower x 1;
fig. 3: Petal and stamen x 5; fig. 4: Ovary x 5; fig. 5: Seed
x 10.

FOSTERELLA PEARCEI (Baker) L. B. Smith, comb. nov.

Cottendorfia pearcei Baker, Handb. Bromel. 128. 1889.

Lindmania pearcei (Baker) Mez in DC. Monogr. Phan. 9:537. 1896.

FOSTERELLA PENDULIFLORA (C. H. Wright) L. B. Smith, comb. nov.

Catopsis penduliflora C. H. Wright, Kew Bull. 1910:197. 1910.

Lindmania penduliflora (C. H. Wright) Stapf, Bot. Mag. 150: pl.
9029. 1924.

FOSTERELLA PETIOLATA (Mez) L. B. Smith, comb. nov.

Lindmania petiolata Mez, Bull. Herb. Boiss. II. 4:864. 1904.

FOSTERELLA ROJASII (L. B. Smith) L. B. Smith, comb. nov.

Lindmania rojasii L. B. Smith, Rev. Argentina Agron. 7:162. figs.
1-3. 1940.

FOSTERELLA RUSBYI (Mez) L. B. Smith, comb. nov.

Lindmania rusbyi Mez, Bot. Jahrb. 30, Beibl. 67:6. 1901.

FOSTERELLA VILLOSULA (Harms) L. B. Smith, comb. nov.

Lindmania villosula Harms, Notizblatt 10:794. 1929.

FOSTERELLA WEBERBAUERI (Mez) L. B. Smith, comb. nov.

Cottendorfia rusbyi Baker, Bull. Torrey Bot. Club 29:697. 1902.

Not Lindmania rusbyi Mez, 1901.

Lindmania weberbaueri Mez, Repert. Sp. Nov. Fedde 12:417. 1913.

FOSTERELLA WEDDELLIANA (Brongn. ex Baker) L. B. Smith, comb. nov.

Cottendorfia weddelliana Brongn. ex Baker, Handb. Bromel. 129.

1889.

Lindmania weddelliana (Brongn. ex Baker) Mez in DC. Monogr. Phan.
9:538. 1896.

VRIESEA, not VRIESIA

The new list of conserved generic names of spermatophytes ratified at the International Botanical Congress in Montreal in 1959 has conserved the amended orthography or spelling of Vriesea as follows:

891. Vriesea Lindley, Bot. Reg. 29: t. 10. 7 Feb. 1843

('Vriesia'); corr. J. G. Beer, Bromel. 91. 1857.

(H. W. Rickett & F. A. Stafleu, Nomina Generica Conservanda et Rejicienda Spermatophytorum, Taxon 8:232. 1959).

VRIESEA RINGENS (Griseb.) Harms, Notizblatt 10:801. 1929.

Tillandsia ringens Griseb. Cat. Pl. Cub. 255. 1866.

Petals not flaccid after anthesis, exceeding the stamens; apical appendage of the seed entire.

PANAMA: Cultivated, November 30, 1954, M. B. Foster 2848 (US, flowers and photos).

CUBA: Oriente: Near Monte Verde, January-July, 1859, C. Wright 1518 (GH, isotype, flowers).

LESSER ANTILLES: St. Vincent: Mountains above Chateaubelair

River, alt. 400-750 m., April 23, 1947, C. V. Morton 5305 (US, fruit).

Harms has already pointed out that Vriesea ringens does not belong in the genus or subgenus Alcantarea, but Mez ignored this fact in his final monograph in the Pflanzenreich. As shown by the material cited above, V. ringens is related to V. viridiflora (Regel) Wittm. ex Mez in the form of its flowers and seed and in its verrucose bracts.

MEXICO

TILLANDSIA MAURYANA L. B. Smith, Contr. Gray Herb. 117:31, pl. 2, figs. 32, 33. 1937.

Tillandsia atroviridipetala Matuda, Cact. 7 Sucul. Mex. 2:53, fig. 40. 1957.

VRIESEA OVANDENSIS Matuda, Cact. 7 Sucul. Mex. 2:78, fig. 51. 1957.

Vriesea platynema sensu L. B. Smith, North Am. Fl. 19:162, 163. 1938, as to "Chiapas" citation. Non Guad. 1843.

MEXICO: Chiapas: On trees, forest, near Fenia, Purpus 300 (US, basis of "V. platynema" citation). Oaxaca: Terrestrial, Cerro Atravesado - Cerro Azul, March 15, 1948, MacDougall "bromel" 136 (US).

As shown by Dr. Matuda, Vriesea ovandensis is distinguished by its long floral bracts that cover the sepals and that are about 4 times as long as the short internodes so that they generally remain imbricate after anthesis. Thus no record remains for V. platynema in continental North America.

VRIESEA VANHYNINGII L. B. Smith, sp. nov.

A V. tonduziana L. B. Smith, cui affinis, laminis foliorum subtus dense lepidotis, bracteis florigeris tenuioribus haud rugulosis sed verrucosis, sepalis minoribus acutis differt.

Stemless, flowering 4 dm. high; leaves about 20 in a broadly funnelform rosette, to 27 cm. long, pale beneath and densely and finely lepidote; sheaths ovate, distinct, 10 cm. long; blades ligulate, acuminate, 25 mm. wide, green above; scape erect, slender; scape-bracts imbricate, closely enfolding the scape, the upper elliptic, apiculate; inflorescence simple, 15 cm. long, densely 10-flowered; rhachis flexuous, slender, slightly sulcate; floral bracts erect, nearly 3 times as long as the internodes, scarcely if at all secund with the flowers, ovate, subacute and slightly cucullate, 4 cm. long, ecarinate, thin-coriaceous, sparsely verrucose, otherwise even, glabrous, pale castaneous when dry; pedicels 10 mm. long; sepals ovate, acute, 25 mm. long, ecarinate, thin-coriaceous, glabrous. Pl. II, fig. 1: Apex of leaf x 1/2; fig. 2: Inflorescence x 1/2; fig. 3: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,219,906, collected on the Sierra de Juarez, 30 miles northeast of Extlan de Juarez, State of Oaxaca, Mexico, altitude 2100 meters, April 18, 1959, by O. C. Van Hyning (No. 5961).

CUBA

VRIESEA PLATYNEMA Gaud. var. *WRIGHTII* (L. B. Smith) L. B. Smith, comb. nov.

Guzmania wrightii L. B. Smith, Contr. Gray Herb. 117:11, pl. 1, figs. 17, 18. 1937.

Vriesea wrightii (L. B. Smith) Carabia, Mem. Soc. Cub. Hist. Nat. 15:361. 1941. As "*Vriesia*."

CUBA: Oriente: Near Monte Verde, *C. Wright* 1523 in part (GH, type). La Prenda, *Hioram* 2566 (NY). El Yunque, *Shafer* 8018 (NY). Sierra de Nipe, *Carabia* 3706 (GH).

This variety differs from typical *Vriesea platynema* in having a short basal part of the inflorescence with polystichous flowers like a *Guzmania* and long floral bracts covering the sepals. Yet the remainder of the inflorescence is indistinguishable from that of the typical variety. Under such circumstances its separation as a species seems unwarranted. The typical variety occurs in Jamaica, making a close parallel with the situation between typical *Tillandsia fasciculata* Sw. and its Cuban variety *clavispi ca* Mez.

COSTA RICA

VRIESEA BICOLOR L. B. Smith, sp. nov.

A *V. acuminata* Mez & Wercklé, cui verisimiliter affinis, laminis foliorum subrotundatis apiculatisque subtus dense adpressequae pallido-lepidotis differt.

Stemless, flowering 75 cm. high; leaves about 12 in a broadly funnelform rosette, 35-50 cm. long; sheaths elliptic, distinct, 15 cm. long, pale-lepidote toward apex, becoming glabrous toward base; blades ligulate, subrounded and apiculate, 6 cm. wide, covered with pale appressed scales beneath, becoming glabrous above; scape erect, stout; scape-bracts erect, imbricate, closely enfolding the scape, the lower subfoliaceous, the upper elliptic, apiculate, densely pale-lepidote, becoming glabrous and lustrous, castaneous when dry; inflorescence simple, narrowly lanceolate, acute, 25 cm. long, strongly complanate, subdensely 19-flowered; rhachis geniculate, stout, sulcate, pale-lepidote; floral bracts suberect, not secund with the flowers, ovate, obtuse and slightly cucullate, 6 cm. long, exceeding the sepals, ecarinate, coriaceous, even, densely pale-lepidote before anthesis, becoming glabrous and sublustrous, bronze-brown (! Foster), castaneous when dry with a very narrow pale margin; pedicels stout, 10 mm. long; sepals broadly ovate, obtuse and slightly cucullate, 35 mm. long, ecarinate, coriaceous, even, covered with pale appressed scales, castaneous; petals elliptic, 6 cm. long, bronze-cream-green at base (! Foster) and bearing 2 acute scales; stamens included. Pl. II, fig. 4: Habit after photo; fig. 5: Sepal x 1.

Type in the U. S. National Herbarium, Nos. 1,985,939 to 1,985,941, collected high in trees, above Cartago, Costa Rica, altitude 1500 meters, December 15, 1948, by Mulford B. Foster (No. 2676).

VRIESEA NUTANS L. B. Smith, sp. nov.

A V. verrucosa L. B. Smith, cui bracteis florigeris verrucosis verisimiliter affinis, scapo elongato decurvato, inflorescentia pendula differt.

Only specimen old and worn but obviously a distinct species, stemless, 8 dm. long with the inflorescence extended; leaves about 15, subfasciculate, to 65 cm. long, green, concolorous, obscurely pale lepidote; sheaths elliptic, 12 cm. long; blades ligulate, acuminate, 25 mm. wide; scape decurved, very slender; scape-bracts imbricate and tightly enfolding the scape, thin, stramineous when dry, verrucose; inflorescence simple, linear, complanate, 18 cm. long, densely 12-flowered; rhachis geniculate, compressed, verrucose below the nodes; floral bracts ovate, over 3 cm. long, much exceeding the sepals, ecarinate, stramineous when dry, densely verrucose; flowers erect, not secund; pedicels stout, 5 mm. long; sepals ovate, over 18 mm. long, ecarinate, nearly even except the rugose-verrucose margins; capsule slenderly ellipsoid, beaked, 4 cm. long; coma white. Pl. II, fig. 6: Apex of leaf x 1; fig. 7: Section of inflorescence x 1.

Type in the U. S. National Herbarium, No. 1,985,982, collected on tree, road from Turrialba to Moravia, Province of San José, Costa Rica, altitude 900 meters, December 20, 1948, by M. B. Foster (No. 2717).

VRIESEA ORORIENSIS (Mez) Smith & Pittendrigh, Journ. Washington Acad. Sci. 43:403. 1953.

Guzmania ororiensis Mez in DC. Monogr. Phan. 9:917. 1896.

Thecophyllum ororiense (Mez) Mez, Bull. Herb. Boiss. II. 3:131. 1903.

Thecophyllum kupperi Suesseng. & Goepfinger, Bot. Jahrb. 72:292. 1942.

Vriesea kupperi (Suesseng. & Goepfinger) Smith & Pittendrigh, Journ. Washington Acad. Sci. 43:402. 1953. As "Vriesia."

COSTA RICA: Near Orori (Orosi), Oersted (Bromel. no.) 25 (C, type, F photo 22323). Irazú Volcano, alt. 2400 m., March 1894, Donnell Smith 4963 (US, paratype). Without locality, Kupper s. n (M, type of Thecophyllum kupperi Suesseng. & Goepfinger, US photo 5493).

BOLIVIA

TILLANDSIA PILOSA L. B. Smith, sp. nov.

A T. recurvata L. et T. mallemontii Glaziou ex Mez, quibus affinis, foliis lepidibus angustissimis retrorsis pilosovestitis, scapi bracteis haud apicalibus, bracteis florigeris glabris vel subglabris differt.

Caulescent, to 14 cm. long in flower; roots present; stems branching, densely massed, to 4 cm. long; leaves distichous, to 7 cm. long, densely pilose-lepidote with fine linear retrorse gray scales; sheaths broadly ovate, thin, several-nerved; blades recurving, linear, terete, ca. 1.5 mm. in diameter, the apex soft and filiform; scape terminal, to 7 cm. long, ca. 0.5 mm. in di-

anther, lepidote at first with suborbicular appressed scales, soon glabrous; scape-bracts typically 2, remote, never apical, forming a tight tube about the scape, lepidote, the lower with a prominent foliaceous blade, the upper soon glabrous; inflorescence simple, laxly 2-flowered and with a sterile remnant at apex; floral bracts ovate, acute, shorter than the sepals, thin, ecarinate, several-nerved, glabrous or nearly so; flowers erect, subsessile; sepals lanceolate, acute, 9 mm. long, short-connate posteriorly, thin, prominently nerved, glabrous; petals blue, drying to deep blue-purple, the blades spreading, elliptic, 2.5 mm. wide; stamens deeply included, exceeding the pistil. Pl. II, fig. 8: Habit x 1/2; fig. 9: Inflorescence x 1.

Type in the U. S. National Herbarium, No. 2,283,921, collected on thorny bushes in dry places, near Saipina, Province of Florida, Department of Santa Cruz, Bolivia, altitude 1800 meters, December 1959, by M. Cárdenas (No. 5513).

Only the shape of the petal-blade separates the subgenera Phytarrhiza and Diaphoranthema and Tillandsia pilosa seems to be about midway between the two. On account of the bright color of the petals I am inclined to place it in Phytarrhiza.

BRAZIL

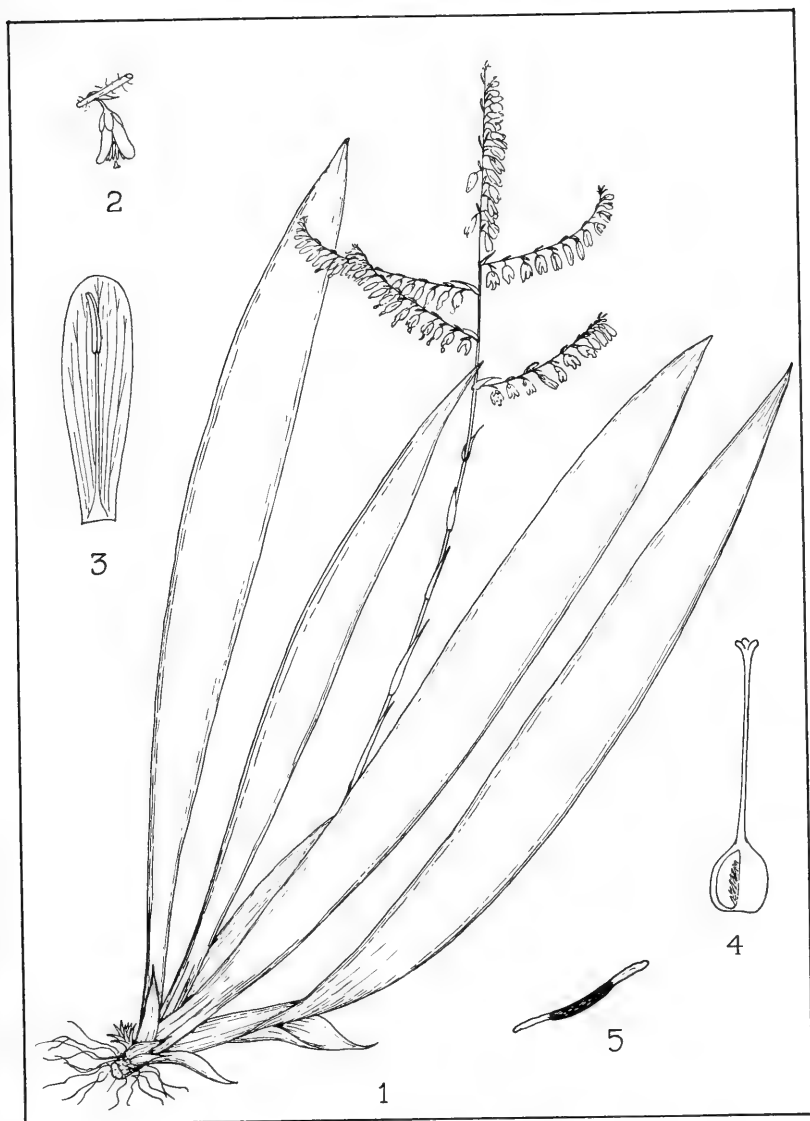
NEOREGELIA DOERINGIANA L. B. Smith, sp. nov.

A N. laeve (Mez) L. B. Smith, cui affinis, foliis minoribus, apice plus serrulatis, vaginis foliorum lepidibus atro-castaneis omnino obtectis, inflorescentia pauciflora, sepalis minus connatis purpureis differt.

Leaves about 10 in a funnel-form rosette that is not constricted at apex, to 18 cm. long; sheaths elliptic, longer than the blades, pale but completely covered by appressed dark castaneous scales; blades broadly ligulate, rounded-retuse with a minute usually deciduous apiculus, ca. 3 cm. wide, obscurely serrulate near apex and entire elsewhere, covered with coarse appressed white scales beneath, soon glabrous above, tinged with dark purple; inflorescence about equaling the leaf-sheaths, 2 cm. in diameter, few-flowered; outer bracts broadly ovate, much exceeded by the sepals, membranaceous, sparsely pale brown-lepidote; floral bracts like the outer bracts but narrower; pedicels slender, 5 mm. long; sepals only slightly asymmetric, oblong, obtuse, 13.5 mm. long; petals white (! Doering). Pl. II, fig. 10: Apex of leaf x 1; fig. 11: Inflorescence x 1; fig. 12: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,320,671, collected in São Vicente, State of São Paulo, Brazil, in 1960, by Walter H. M. Doering (No. 7).

Plate I



FOSTERELLA MICRANTHA

Fig. 1: Habit (Mexia 9187a) x 2/5; fig. 2: Flower x 1;
fig. 3: Petal and stamen x 5; fig. 4:
Ovary x 5; fig. 5: Seed x 10.

Plate II

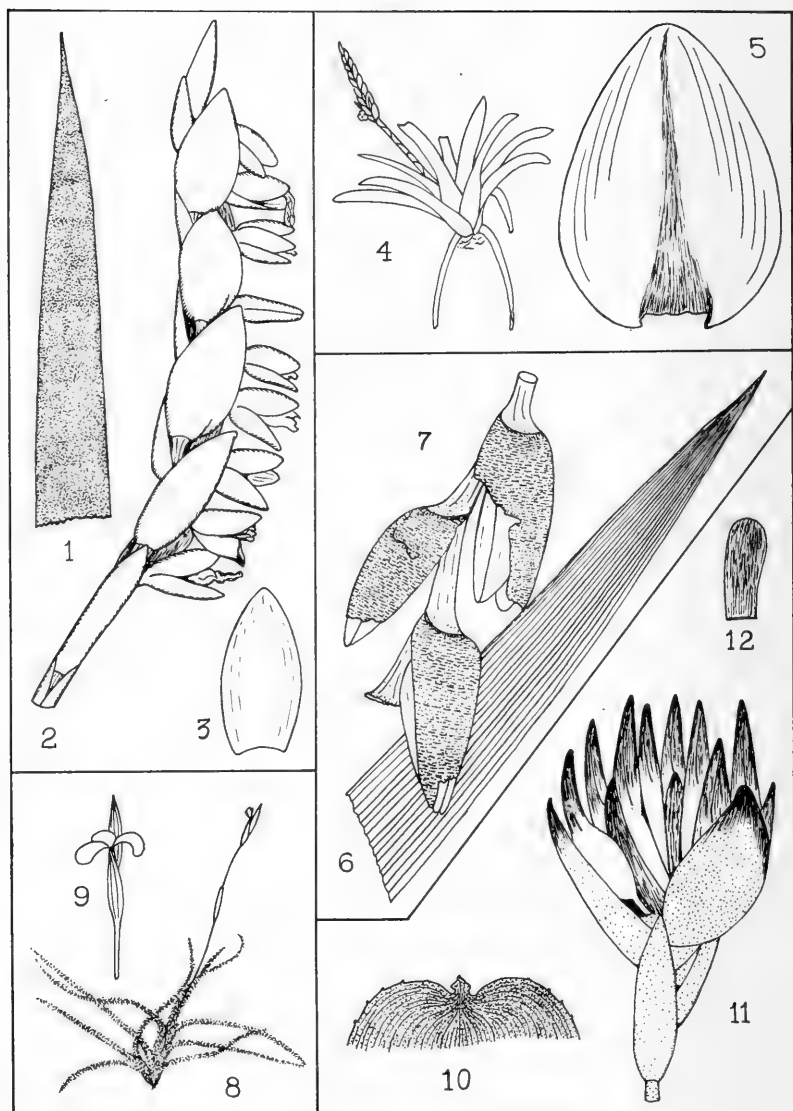


Fig. 1-3: *Vriesea vanhyningii*; fig. 4, 5: *V. bicolor*;
 fig. 6, 7: *V. nutans*; fig. 8, 9: *Tillandsia pilosa*;
 fig. 10-12: *Neoregelia doeringiana*.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS AVICENNIA. II

Harold N. Moldenke

AVICENNIA GERMINANS (L.) Stearn

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An erect or spreading low shrub or handsome and symmetrical slender tree, to 25 m. tall, sometimes bushy, generally not over 12 or 14 m. tall, usually intermixed with other mangroves but normally exceeding them in height; trunk short, to 50 cm. in di-

ameter; bole crooked, sometimes to 40 cm. in diameter at breast height; roots deep-seated; pneumatophores many, small, erect, about the thickness of a pencil, projecting 5--10 cm. above the water, leafless; stilt-roots absent; heartwood dark-brown, hard, heavy, rough, medium-textured, oily, laminated, close-grained, durable, with the odor of mushrooms when freshly cut, specific gravity (air-dry) 0.95, tending to split at the phloem layers, the grain interlocked; bark varying from black or dark-brown to dark reddish-brown or gray, yellow when scraped, smoothish, sparsely longitudinally cracked or shallowly fissured and rather scaly; branches spreading, crooked; branchlets and twigs slender, often more or less articulate, brownish, more or less tetragonal, often obscurely margined on the angles, glabrous or minutely grayish-pubescent, often shiny, very sparsely lenticellate with scattered corky lenticels; nodes swollen, distinctly annulate; principal internodes 1.5--9 cm. long; leaves decussate-opposite; petioles rather slender, 2--27 mm. long, flattened and canaliculate above, convex beneath, mealy or glabrous, often wrinkled in drying, slightly ampliate at the base; leaf-blades firmly chartaceous or subcoriaceous, sometimes coriaceous, varying from gray- or bright-green to rich- or dark-green and very shiny above, mostly of the same color beneath, but the lamina usually obscured by a whitish furf so as to impart a bicolored appearance to the leaves and these then appearing pale- or gray-silvery or grayish beneath, occasionally brunnescent or nigrescent on both surfaces in drying (especially when the furf is absent), varying from lanceolate or lanceolate-oblong to oblong, elliptic, or obovate, 4.5--15 cm. long, 1.8--4.4 cm. wide, varying from acute to blunt or obtuse at the apex, entire, acute or acuminate to cuneate at the base, glabrous but densely impressed-punctulate above, varying from uniformly and densely whitish- or grayish-furfuraceous or pulverulent-tomentellous (with very closely appressed furf) to glabrous and more or less punctate beneath, the furf apparently deciduous in patches on some forms; midrib slender (or rather stout at the base and rapidly diminishing in size as the apex is approached), usually prominent above (especially toward the apex) or flattened and more or less canaliculate toward the base, prominent to the apex beneath or somewhat flattened toward the base; secondaries slender, 5--10 per side, very irregular, rather uniformly ascending at angles of about 45° and uniformly prominent throughout on both surfaces, very plainly connected some distance from the margins by an equally prominent collective vein; tertiaries few, usually more or less parallel with the secondaries, often obscure above, prominent beneath; veinlet reticulation sparse, mostly obscure or indiscernible above and often also beneath; inflorescence axillary and terminal, spicate, attracting myriads of insects; spikes 1.5--6.5 cm. long, 1--1.5 cm. wide during anthesis, the axillary ones usually confined to 1 pair at the base of the terminal one and shorter than it or another pair in the next lower axils, dense; flowers usually opposite, 1--15 pairs per spike, sessile, sometimes few and distant, sometimes close and decussate or densely glomerate-crowded, small, zygomorphic, 1--2

cm. wide during anthesis, fragrant with a strong or weak aroma, highly nectariferous and attractive to honeybees; bractlets and prophylla light-green, ovate or oblong, sessile, closely appressed to the calyx, obtuse or acute at the apex, densely sericeous-pubescent with cinereous appressed hairs on the outer surface; calyx light-green, the lobes ovate, 3--5 mm. long, 2--3 mm. wide, densely appressed-pubescent on the outside, glabrous within; corolla campanulate, varying from pure- or pale-yellow to cream-colored or white, apparently yellow when first opening and later turning white, sometimes white with a yellow throat or cream with an orange throat, occasionally creamy on the lips and brown below, 12--20 mm. long and about 10 mm. wide, parted to about the middle, the tube equaling or shorter than the calyx, practically glabrous, the lobes 4, spreading, unequal, 2--2.5 mm. long, oblong or subquadrate, rounded at the apex, densely cinereous-pubescent on the outer surface with appressed hairs, velutinous-tomentose within, finally so completely reflexed as to touch the corolla-tube; stamens slightly exserted from the corolla-tube, included by the lobes, finally blackish and conspicuous when the corolla-lobes become completely reflexed; pistil as long as the stamens; stigma bilobed, finally conspicuous when the corolla-lobes become completely reflexed; fruiting-calyx enlarged, but not at all incrassate or indurated, 5-parted practically to the base, about 9 mm. in diameter, each lobe ovate-lanceolate, about 4 mm. long, about 2 mm. wide at the base, acute at the apex, densely short-strigose with appressed white or gray hairs, wide-spreading, glabrous and shiny within; fruit a soft, thin-walled, yellowish capsule, oblong or elliptic to more or less obpyriform or ovate and asymmetric, 1.2--5 cm. long, 7--13 mm. wide, often turning almost plum-color when exposed to the sun, apiculate at the apex when young, densely white- or gray-pulverulent or sparsely pubescent throughout, often also more or less white-strigose (especially at the apex and on the apiculation), opening longitudinally, containing one large seed with big cotyledons that are greenish with a dull-purplish tinge; hypocotyl almost as long as the inner cotyledon, pubescent for almost its whole length, without visible side-rootlets in fruit; plumule not visible to the naked eye.

This very common species is found from Florida and Texas in the United States, Bermuda, and the Bahamas, throughout the West Indies, both coasts of Mexico, through Central America, to the coasts of Brazil and Peru; also in the Galapagos and other islands off the coasts of tropical and subtropical America.

The type of this very common and apparently highly variable species was collected by Patrick Browne in Jamaica, and is deposited in the Linnean Herbarium (813.2) in London. Linnaeus based his Bontia germinans on Browne's Jamaican plant and on a collection made by Pehr Löfling probably at Cumaná, Venezuela, but Stearn, when he transferred the taxon to the genus Avicennia, restricted the typification to the Jamaican collection. Linnaeus' original description is "B. fol. oppositis, pedunculis spicatis. Brown. jam. 263. Loeffl. hisp. 193". Browne described his plant as "Olive Mangrove Tree***frequent near the sea, both on the

north and south side of Jamaica; and remarkable on account of its cineritious colour, and the narrow form of its leaves." As Stearn has pointed out, "Browne stated that 'its capsules are compressed, and somewhat roundish; but irregular, and obliquely lengthened; and contain each a compressed foliaceous seed, that swells and germinates before it falls.' From this observation and Browne's description, 'semen unicum quadrilobum germinans, lobis foliaceis', Linnaeus took the appropriate epithet germinans. The description in Löffling's Iter Hispanicum, 193 (1758), under Bontia, does not allude to this viviparous habit. Hence it is reasonable to typify the name Bontia germinans by Browne's specimen in the Linnaean Herbarium." Stearn goes on to point out that "In the second edition of the Species Plantarum, 2: 891 (1763) Linnaeus's concept of Bontia germinans expanded to include the Avicennia officinalis of the first edition, 1: 110 (1753); the distribution 'in India' thus covers both the East and West Indies." Herein Linnaeus erred, since A. germinans and A. officinalis are quite distinct.

It is worth mentioning here that Record & Hess, in the reference cited above (1943) reduce A. nitida to synonymy under the east African and tropical Asian A. marina (Forsk.) Vierh. Montealegre & Hogg, in an article entitled "Las selvas de Costa Rica" in Revista del Instituto de Defensa del Cafe de Costa Rica, vol. 15, no. 131, page 571 (1945) state that Avicennia marina is the correct name for the American species as found in Costa Rica, and that A. nitida is an Asiatic tree! This statement is apparently copied from Merker, Barbour, Scholten, & Dayton's "Forests of Costa Rica", page 67 (1943). How these authors ever came to this amazing and entirely erroneous conclusion is inexplicable to me.

It has been suggested by early authors that the Cynoxylum americanum folio crassiusculo mollis & tenaci Pluk., Alm. 127 Phyt. pl. 172, fig. 6 (1696) may be this plant, but Plukenet's plant is actually Nyssa aquatica L., in the Nyssaceae. His drawing shows definitely alternate oblanceolate leaves.

A. nitida is regarded as both American and west African by Briquet (1894), Walter & Steiner (1936), Standley (1938), Quesnel (1941), Darlington & Janaki Ammal (1945), and Stearn (1958). J. G. Baker (1900) keeps the African material separate as A. africana P. Beauv., but notes "Perhaps not distinct specifically from the American A. nitida, Jacq." Schauer (1851) keeps A. africana apart definitely, saying "Proxima Av. nitidae diversa tamen: foliis obtusis, supra minus nitidis (neque siccitate nigrescentibus) subtus neque niveis neque (quantum equidem cognovi) calvescentibus."

Standley (1938) says it is "Abundant in mangrove (Rhizophora) swamps of the Pacific coast, and doubtless also of the Atlantic. Widely distributed in the tropics of both hemispheres." Beard, in his paper entitled "Climax vegetation in tropical America" in Ecology 25: 130 (1944) affirms that "The mangrove association Rhizophora mangle - Avicennia nitida - Laguncularia racemosa ranges throughout the tropical Atlantic seacoasts of Africa and

America."

The types of A. nitida Jacq. and A. tomentosa Jacq. are both Herb. Jacquin s.n. specimens deposited in the herbarium of the British Museum in London, the former having the leaf-blades glabrous and the latter having them densely furfuraceous-tomentelous beneath. The two forms, when thus viewed from isolated specimens, certainly do appear distinct. Grisebach (1866) records both A. nitida and A. tomentosa from Cuba. Lamarck distinguishes the two as follows: A. nitida - "foliis lanceolatis, acutis, utrinque nitidis", and A. tomentosa - "foliis ovato-oblongis, subtus tomentosus". He cites Jacquin's fig. 1 for the former and fig. 2 for the latter and includes Oepata Rheedee in the latter's synonymy. Oepata, however, is a synonym of A. officinalis L.

The type of A. nitida Sessé & Moc. is Sessé, Mocino, Castillo, & Maldonado 2188 from Mexico, that of A. elliptica is Westin s.n. from Brazil in the Thunberg Herbarium, of A. tomentosa var. cumanensis is Humboldt [Bonpland] 68 in the herbarium of the Botanisches Museum at Berlin, of A. tomentosa var. guayaquilensis is Bonpland s.n. from Guayaquil, Ecuador, in the herbarium of the Muséum National d'Histoire Naturelle at Paris, and of A. tomentosa var. campechensis is Bonpland s.n. from Campeche, Mexico, in the same herbarium. The type of A. officinalis var. lanceolata is Kuntze s.n., collected in April, 1874, in Trinidad, deposited in the Britton Herbarium at the New York Botanical Garden. The type of A. tomentosa Sieber (in part) and of A. lamarckiana is Sieber Fl. Mart. 318 from Martinique. The type of A. floridana Gandoger is A. S. Hitchcock 270 from Lee County, Florida.

It is worth mentioning that Presl, in his Bot. Bemerck. (1844), refers to an "Avicennia tomentosa" of Sieber, Fl. Trin. on pp. 98--99, which is A. germinans, and Fl. Nov. Holl. on p. 99, which is A. marina var. resinifera (Forst.) Bakh.

Kuntze's original description of his A. officinalis var. lanceolata is "folia late lanceolata (1:±3)", and he adds "Auch in den anderen Erdtheilen innerhalb der heissen Zone nicht selten."

Numerous illustrations in addition to those cited above are purported to depict this species, but examination shows them to be misidentified. For instance, the "Avicennia nitida" illustrated in Vell., Fl. Flum. 6: pl. 56 (1827) is actually A. schaueriana Stapf & Leechman, and that in Engl. & Drude, Veget. Erde 9 (1): 2, pl. 45 (1910) is A. africana P. Beauv. The illustration of "A. tomentosa" in Wall., Pl. Asiat. Rar. 3: pl. 271 (1832), Wight, Ic. Pl. Ind. Or. 4: pl. 1481 (1849), Wight, Illustr. Ind. Bot. 2: pl. 173 bis (1850), Schnitzlein, Iconogr. 2: pl. 137** (1856), Baill., Hist. Pl. 11: 88 (1891), Schimper, Bot. Mitt. Tropen 3: pl. 6, fig. 2 & 3 (1891), Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 181 (1895), and Wettstein, Handb. Syst. Bot., ed. 2, 739 (1911) are all A. officinalis L. The "A. tomentosa" illustrated in Blanco, Fl. Filip., ed. 3, 2: pl. 74 (1878) is A.

marina var. rumphiana (H. Hallier) Bakh., while that in Wettstein, Veg. Stüdbras. pl. 17 & 18 (1904) is A. schaueriana. I have not been able to verify the identity of the plant illustrated in Neger, Biol. Pflanz. 352 (1913).

The Guapira Aubl. and Gynastrum Neck. cited by Schauer in Mart., Fl. Bras. 9: 304 (1851) as synonyms of this species are actually synonyms of Pisonia L. in the Pisoniaceae. In Phytologia 7: 167 I dated Griseb., Fl. Br. W. Ind. 502 as "1864" -- this is an error, the correct date for the page in question is 1861.

Quite a few specimens -- including Sessé, Mocino, Castillo, & Maldonado 2189, A. A. Eaton 908, Debeaux 73 (in part), Trin. Bot. Gard. Herb. 5405, and some of the W. E. Broadway s.n. collections -- have been identified and distributed as Avicennia nitida, but are actually Laguncularia racemosa (L.) Gaertn. f. in the Combretaceae. Gaumer 635 was identified and distributed as A. officinalis, but is in part A. germinans and in part Laguncularia racemosa. Material of A. germinans has often been misidentified as "A. tomentosa L." [which is A. marina (Forsk.) Vierh.] and even as "Diospyros eteni". Johansen s.n. was distributed as Rhizophora mangle L., Schomburgk 845 as Drepanocarpus inundatus Mart., Schott 473 as "Myoporaceae", and Berg s.n., Herb. Mus. Bot. Lund. s.n., and Collector undesignated s.n. [St. Croix] as Conocarpus erecta L. Galeotti 2686, Tamayo 893, Reynolds s.n., and the A. Stewart collections from the Galapagos Islands, among many others, were misidentified and originally distributed as A. officinalis. The Collector undesignated 58 specimen at Madrid, said to be from French Guiana, looks strikingly much like A. africana, and may very possibly have come from French Guinea rather than French Guiana.

Our species is recorded by Berry (1925) in the fossil form from Pleistocene formations in Trinidad. The Herb. Forest Dept. F. M. S. 2767 erroneously cited as "A. nitida" by me in my Alph. List. Cit. 2: 353 (1948), is actually a cotype of A. lanata Ridl.

A. germinans is a very common species in the mangrove swamps of the New World, especially on their landward side. Collectors have recorded it from mangrove thickets, the edges of mangrove thickets, in swamps and at the edges of swamps, along rivers, on beaches, in tidal flats and bordering tidal flats, in serpentine marshes, on low islands and shores, in lagoons and the borders of lagoons, in low marshes, at the mouths of lagoons, in dense tidal forests, in the arid coastal belt, along the seacoast, at the water's edge, in salt lakes, in sandy flats near the water-line of bays, in sandy-salty soil, in and around salt marshes and in tidal marshes, in mud at the head of sea lagoons, and in low calcareous soil. In Florida it is frequent along roadsides on the keys; Stewart says it is common on the beaches and around a salt lake on Charles Island in the Galapagos. Box reports that it grows in the inner zone of mangrove swamps and coastal mud-flats, generally in pure societies, covering large areas. In El Salvador

it has been found on a hillside along the beach. It has been collected at altitudes from sea-level to 15 meters. It very often grows in association with Rhizophora mangle L. Curran reports that he found it in "fresh water" in Pará, Brazil. Taylor says that on Indefatigable Island "this is the less frequent of the mangroves, which are almost all Rhizophora; this forms tall trees (40—50 ft.) which show up above the shrub vegetation of the adjacent dry belt (only tree of any size there being Opuntia and a few Piscidia erythrinia)". Schipp notes that it is plentiful in tidal flats in British Honduras, the wood being hard and close-grained, good for knees in boat-building. Ferris reports that in Baja California it grows in association with Rhizophora, Laguncularia, Batis, and Maytenus. Rimbach states that in Guayas its wood is used for construction purposes and the tree "forms woods in back of the mangrove.....on low salty ground which becomes inundated only by the high tides." Standley reports it as abundant in Izabal, Guatemala. The Lundells affirm that in Yucatán it is "a dominant in mangrove swamps bordering cienaga." Little says it is "common in scattered patches, with scattered trees at edge of water" in Ecuador. Egler asserts that it forms a zone at the edge of bare sand in the saline arid zone in Martinique, being "a common tree of the mangroves, naturally occurring in a broad zone landward of Rhizophora, on sand or clay; palatable to stock; now widely destroyed because of cutting and grazing."

Sudworth gives the range of the species as "Florida coast (from St. Augustine to the southern keys on the east coast and on the west coast from Cedar Keys to Cape Sable); Louisiana (islands in Mississippi Sound and on coast in Cameron and Terrebonne Parishes)." Runyon refers to it as "rare" in the Brownsville area of Texas.

Lundell (1942) says that it is one of the principal species above the tidal area in British Honduras. I. M. Johnston reports that in Baja California it is "a frequent tree in saline soil usually at or about high-tide mark". His "San Evaristo Bay" specimens are from a bay on peninsular Baja California, on the Gulf side, below the middle. Other localities for the species in that region are given by him in Proc. Calif. Acad. Sci., ser. 4, 12: 1152 (1924). Bailey found it "at El Camote, Oaxaca, inland from Chacahua, on shore of laguna". Runyon describes it as a "handsome shrub for salty ground." Spalding says "of small size on the flats and in shallow water between New Smyrna [Florida] and the Peninsula. Apparently its northern limit. Freezes are reported to have killed the mangroves at this point. Much dead brush was still to be seen [March, 1902]." For a description of the habitat of this species in Florida as compared with the two other species of Floridian mangroves, see John H. Davis in Fla. Geol. Surv. Bull. 25: 187—192 (1943) and Carnegie Inst. Wash. Publ. 517: 303—412 (1940) — the first paper is entitled "The natural features of southern Florida especially the vegetation, and the everglades", while the latter is "The ecology and geologic role of mangroves in Florida."

Cañas (1937) reports that the resin of this plant is very useful in the treatment of ulcers and tumors, diluted in a grease or, better, vaseline, at 30 percent. Choussy says the gum is an irritant, used by the natives of El Salvador for afflictions of the throat. An unknown collector in the West Indies reports that the roots and unripe fruit are used medicinally there. Johansen says that "the wood is of great strength, used in construction of houses in Puerto Rico, turns red when submerged in water and is then practically incorruptible, makes a fine grade of charcoal, and bark used for tanning leather." It is worth noting, however, that he determined the specimen concerning which he records these facts as "Rhizophora mangle", so it is very possible that some of his comments, at least, apply to that species rather than to Avicennia germinans. Elias, however, also reports that the wood is "used for firewood, to make charcoal, and the bark for tanning leather." Mexia reports that the species is employed for firewood in Nayarit, Mexico. Jennings reiterates that the wood is very resistant under water and the bark is used for tanning. Perez Arbeláez reports the gum used for infirmities of the chest in Colombia. Fróes found the wood being used for marine construction in Brazil. Miranda (1952) notes "la corteza se usa como curtiente" in Chiapas, Mexico. Merker reports that the species is "little used in Costa Rica except for firewood".

Roig (1945) says "Según Gómez de la Maza, la resina...la usan como alimento los neo-holandeses y las hojas verdes, cocidas con las hojas verdes de la Ipomoea campanulata L. sirven para hacer cataplasmas emolientes. Agrega que los árabes usan la raíz mucilagínosa y salada de esta planta como afrodisíaco, propoedad que debe a su acción corroborante y dinamófora. Del Avicennia nitida Jacq. dice lo siguiente: 'Astringente, sucedáneo de Mangle blanco. Hase usado como febrífuga.' Las hojas de esta planta son aromáticas, así como sus flores que son muy visitadas por las abejas. Esta es una de las especies que nos han dicho que producen la resina medicinal llamada Cativo mangle, cosa que no hemos podido comprobar. Según Cañas, las resina es muy útil para las úlceras y tumores, diluida en una grasa, más bien vaselina, al 30 por ciento. En Yucatán, Méjico, emplean el cocimiento de la corteza, tanto al exterior como al interior, contra hemorroides, heridas y diarreas. La goma que exuda el tronco es eficaz para curar las enfermedades del pecho, según P. Arbeláez." Of course, the Australian and Arabian plants referred to here cannot be this species, and are probably A. marina (Forsk.) Vierh.

Roig (1953) says "Su madera es excelente, de color pardo oscuro, muy duradera & dura. Se la emplea en horconaduras, diques, muelles y toda clase de construcciones navales por su resistencia a la acción de las aguas. En las construcciones rurales puede usarse bajo techo. En San Luis, Pinar del Río, dicen que la resina que brota del tronco es el bálsamo de cativo mangle. Las flores son olorosas y son visitadas por las abejas. No es estimada esta planta para fabricar carbón vegetal."

Terrac (1947) notes that this species is an "Arbuste de la mangrove à écorce astringente. Le bois renferme 1% de lapachol."

Root & Deyell (1945) give an interesting account of this species as a source of honey in Florida. "In Florida it is not found to much extent north of Ormond on the east coast. It usually grows back of the red mangrove, and in the localities where both grow together the red mangrove fringes the shores and makes new land. But black mangrove is the honey plant. The honey is light colored, but the flavor has a tang that many do not like. It is sometimes blended with palmetto.....The wood is dark brown and very durable in contact with the soil. When used as fuel it burns with intense heat. Up to the year of the 'big freeze', in 1894, phenomenal yields were reported. As much as 400 pounds of honey from one hive in a single season has been recorded. It was hardly possible then to overstock a mangrove section in a favorable season. But the severe winter of 1894 froze and killed the mangrove to the ground. It did not recover from this check for 18 years, and not until 1909 did it again yield nectar, and then only in small quantities. Since that year the bushes have gradually grown in size and the yields have increased also, but as yet they cannot even be compared with those preceding 1894.

"On the numerous small islands of Indian River and along the east coast of Florida southward from Ormond, there are thousands of acres of black mangrove from six to fifteen feet tall. There are a few beekeepers located in the mangrove swamps of southwestern Florida, but not so many as on the east coast, as at Ariel and at New Smyrna. At Cocoanut Grove.....a mixture of mangrove and cocoanut honey is secured, which is much lighter than the mangrove honey alone.....There are also a few colonies of bees in the vicinity of Everglades.....At Punta Gorda on the west coast black mangrove begins to bloom May 1st until July 15th or a little later. When atmospheric conditions are favorable the nectar can be seen in large drops shining in the little cups, and a bee can obtain a load from a single blossom. According to Frank Stirling of the State Plant Board of Florida, the honey is dark colored and is used very largely in the manufacture of sweet cakes. On the east coast it is usually blended with the honey from cabbage palmetto, which blooms at the same time, and is in consequence lighter colored but thin and not very sweet, with a salty or brackish taste.....

"The secretion of nectar is greatly influenced by the weather. In 1911 near New Smyrna it yielded well early in the season, and the bees left their hives for the mangrove swamps almost before dawn, hurrying across the coves of salt water the entire day; but after two weeks the weather suddenly changed and hardly a bee was seen again on the blossoms, although they still continued to open. At Punta Gorda in 1919 the crop of mangrove was very small, but in 1918 it probably exceeded 100 pounds per colony. In the same year a beekeeper below Ft. Myers reported the crop a failure!

In their 1923 work the Roots give some additional interesting information: "....the red mangrove fringes the shore and makes new land, while the black mangrove is a soil-former. Both are valuable in catching drift and lodging humus and gradually transforming the shallows into reefs and islands and finally into sol-

id land. But the black mangrove does not actually grow in the water. The black mangrove, when it grows to the size of a tree, resembles a scragly old oak with a rough brown bark. It may be 25 to 50 feet tall with a trunk diameter of four feet, or on the Keys it may attain even greater size. Northward it is seldom more than a shrub.....The wood....when used as fuel.....burns with intense heat, As a source of honey the black mangrove has attracted more attention than any other tree in Florida....In earlier days migratory beekeeping was in practice, and many colonies of bees were moved to the vicinity of Hawks Park from points up and down the coast and from inland localities 50 miles distant."

In their 1920 work they report that "The flowers are inconspicuous, of a yellowish-green hue, blossoming in a spike or head, the same flower stalk carrying both old and new blossoms at the same time. This peculiarity lengthens out the bloom-period very considerably, which lasts from six to eight weeks in most favorable seasons. The wood closely resembles ebony in color and weight...and burns with a peculiar crackling sputter. The stove door must not be tightly closed in burning the wood or it will not burn steadilyIt is the whitest honey in Florida, with perhaps the single exception of cabbage palmetto. The body is rather thin, tho better in that on the Keys than on the mainland. In flavor it is very sweet and mild and has just the barest suggestion of brackishness about it, due either to the soil or the vicinity of the salt marshes. The brackishness is not at all objectionable. The honey is usually pronounced first class, and ranks with the four best honeys of Florida -- namely, the white tupelo, the orange, the scrub palmetto, and the mangrove. Up to.....1894 it was without exception the greatest yielder of honey of any plant in the world!"

A species with as wide a geographic distribution as this one may be expected to have a great many common names and vernacular names. Included are "algarrobo", "apalioe", "arbor de sal", "avicenne cotonneux", "avicenne luisant", "black mangrove", "black-mangrove", "blackmangrove", "black tree", "blacktree", "black wood", "blackwood", "black wood bush", "blackwood bush", "blak mangrove", "bois de mêche", "button mangrove", "canóá", "carnôé", "cative mangle", "cereibuna", "cereitinga", "chifle de vaca", "ciriuba", "columnate", "conrida", "courida", "cowrida", "culumate", "false mangrove", "glänzender Salzbaum", "green turtle bough", "guapirá", "guapirú", "honey mangrove", "honey-mangrove", "iguanero", "ishtaten", "ishtatén", "istaten", "istatén", "koroda", "mangel", "mangel blanco", "mangle", "mangle blanc", "mangle blanco", "mangle bobo", "mangle chéne", "mangle iguanero", "mangle negro", "mangle prieto", "mangle rosado", "mangle salado", "manglesito", "manglier noir", "manglo salado", "mangrove", "mangue", "mangue amarello", "mangue-amarelo", "mangue amarillo", "mangue branco", "mangue-branco", "mangue ciriuba", "manguel blanca", "mangue seriba", "mangue seriva", "mangue siriba", "olive mangrove", "olive-mangrove", "olive mangrove tree", "paléluvier", "paleo de sal", "palétuvier", "palétuvier blanc", "palétuvier gris", "palétuvier rouge", "palo de sal", "palo de sol", "palo do sal", "paltuvier gris", "pao de

caranguejo", "páo de caranguejo", "pariva", "parwa", "parwaboom", "pére", "péré", "pugueaje", "pugueaje", "puyece", "puyegue", "saladillo", "saltbushes", "salt pond", "salt-pond", "saraiba", "seriba", "sereiba", "seriuba", "sireiba", "siriba", "siriuba", "siríuba", "siruva", "white Brazil mangrove", "white mangrove", and "witte mangrove". Cañas reports that the name "cative mangle" is applied to this plant erroneously in Cuba. Likewise, it is probable that the names "white Brazil mangrove", "white mangrove", and "witte mangrove" are applied erroneously, since they belong more properly to Laguncularia racemosa, with which our plant is often confused. The name "button mangrove", similarly, really belongs to Conocarpus erecta.

The physico-chemical properties of the sap of A. germinans in relation to phytogeography are discussed by Harris in the 1934 reference cited above. Ovary sections are shown by Junell on p. 141, fig. 222, of the 1934 reference above. Scholander, in Am. Journ. Bot. 42: 92-98 (1955), discusses the methods of gas exchange in the roots. The pneumatophores are well illustrated in Nature 144: 964, fig. 3 (1939). Allen reports that the species has "stilt roots" in Panama, but this is very probably an error in observation. My friend, Dr. I. L. Wiggins, says that in collecting material of this plant in Baja California salt crystals formed densely on the leaves after they were dried and that overnight these deliquesced to as to soak the botanical driers again. He recommends that the crystals be washed off by dipping the specimens in a stream after they have formed, and then re-drying the specimens in the normal way.

Gentry in Allan Hancock Pacif. Exped. 13 (2): 78 (1949) cites Elmore 1B2 from Marie Magdalena Island, but this collection has not yet been seen by me. Luetzelburg (1923) records the species from Parafba, Sergipe, and Rio de Janeiro, Brazil, but it is not certain if he refers actually to this plant or to A. schaueriana. Alain (1946) refers to it as a "neo-tropical" species, which, in my opinion, is correct. The Little 6750 [Forest Service 98495] sometimes cited as from Bolívar, Ecuador, was actually collected in Guayas. The original labels were incorrectly written, as has been explained to me by the collector himself in a letter dated May 31, 1946. Chapin reports that Crospiza fortis often nests in this tree on the Galapagos Islands. Stehlé (1937) points out that this species and Rhizophora mangle grow together in Guadeloupe under very special conditions of salinity, humidity, etc., and are characterized by their rapidity of germination. I. E. Stewart (1954) reports that both sexes of the common saltmarsh mosquito (Aedes taeniorhynchus) feed on the nectar of this species, especially immediately before and after the male swarming periods and if no nectar from this plant or from spanish-needles, cabbage palm, saw palmetto, button mangrove, or sea-grape or honeydew from green aphids is available at the breeding site, migration is likely to occur.

A sheet of Hostmann 1140 in the Delessert Herbarium at Geneva is inscribed as having been collected in British Guiana, but un-

doubtedly came from Surinam. Box, in his manuscript Flora of Antigua, cites Douglas s.n. in the Sloane Herbarium at the British Museum, Wulfschlägel 438 at Munich, and Gregory s.n. at the British Museum from Antigua [the last-mentioned being from "Five Islands"], and Box & Charter s.n. [May, 1937] from Barbuda. Of these, I have thus far seen only the Gregory and Wulfschlägel specimens.

Cuatrecasas in Bol. Soc. Bot. Mex. 23: 85 & 94 (1958) describes an ecologic formation called "Avicennietum nitidae". Seymour reports that the species is attacked by the fungus Irene sepula (Pat.) Toro [Neliola sepulta Pat.]. Houard, in Zootéc. Pl. Amer. Sud 352--354 (1933) reports that it is infested by two species of cecidomyiids -- one undetermined from Brazil and the other determined as Cecidomyia avicenniae by Cook from Cuba -- and by an unidentified species of eriophyid from Brazil. In Guiana he reports that it is infested by Erineum croceum Fée and in Dominica by E. pallidum Kunze. In fact, in the introduction of his work he points out that insect galls are found quite abundantly on the leaves of Avicennia, especially in Cuba. Such galls are shown on the Smeathman specimen in the British Museum herbarium.

Shafer collected seedlings in October in Cuba, and Rhodes did the same in October in Florida. The species has been collected in anthesis in every month of the year, and in fruit from July to October. The specific portion of the name A. nitida is often upper-cased without justification. The collector Salzmann's name is misspelled "Saltzmann" on some labels, while Hostmann's name is given as "Hortmann" in the Paris herbarium.

V. J. Chapman, in Journ. Linn. Soc. Lond. Bot. 52: 429 (1914) says: "The species is viviparous, as germination takes place in the fruit. A single tree will produce about 300 seeds per annum, the maximum production coming from trees growing on clay. Guppy (1917) has recorded that seedlings will retain their vitality for 25 days with partial drying and after 50% of their water has been lost. The bark contains about 12% of tannin which is not sufficient to make it satisfactory for commercial use. Control of the osmotic pressure in the tissues of this species is probably secured by means of the salt-secreting glands which are to be found on the leaves. In the northern hemisphere this species is to be found in the same localities as Rhizophora mangle, except that it does not penetrate to the Pacific Islands. On the shores of tropical West Africa it is to be found from Senegal to Port Congo. The appearance of the species is slightly different on these shores and it has been known as Avicennia africana P. Beauv., but it does not seem sufficiently distinct to warrant segregation as a separate species. If the western mangroves originated in West Africa then var. africana would have to be regarded as the parent species. A. tomentosa Jacq., which is distinguished from A. nitida by broader leaves and sessile stigmas, is said to grow in a few Caribbean islands, and though recorded from Jamaica it was not seen in the vicinity of Kingston. Ridley (1936) reports New Guinea as the home of A. tomentosa, but it has probably been con-

fused here with another species. Ridley in a letter informs me that his plant is distinct and will have to receive another name. Schimper, on the other hand, restricts A. tomentosa to South America. The nature of the characters separating it from A. nitida suggest that it really should be regarded as a variety of that somewhat polymorphic species." Of course, the New World "A. tomentosa" here referred to is in part A. germinans and in part A. schaueriana. It is worth noting here that Rhizophora mangle L. has also been described as occurring in West Africa as well as in the New World, but the African form, as in Avicennia, differs somewhat from the American form and is now known as R. racemosa G. F. W. Mey. On page 487 of the same work Chapman notes that "In most plants one would refer to the seed, but in Avicennia there is no resting period, and growth of the embryo proceeds steadily. Although still surrounded by the testa the young fruit is quite capable of an independent existence long before it falls from the parent tree. For this reason I have preferred to call it a seedling rather than a seed. It might also be termed an embryo."

Ridley, in his Dispersal Pl. 310 & 499 (1930), says that "The A. tomentosa of New Guinea is very near this", but to which of the six types of Avicennia known from New Guinea he and Chapman refer is not clear.

Schott confused the Mexican material of A. germinans with the related Old World family Myoporaceae, while Millspaugh thought that some specimens [notably Gaumer 635 and Schott 473] represented the Old World A. officinalis L. [vid., Field Mus. Publ. Bot. 1: 316 (1896) and 386. 1898]. Millspaugh's opinion that two species were represented in the Yucatán material, Humboldt & Bonpland's proposal of three varieties, and Jacquin's proposal of two distinct species for the common North American, Mexican, Central, and South American species here regarded as A. germinans are all very understandable. If one examines only a relatively few isolated specimens from various widely scattered points in its tremendous range, as Humboldt & Bonpland seem to have done, or if one considers the very glabrous and shiny form as contrasted with the densely farinaceous-tomentellous form from isolated specimens of each, as Jacquin apparently did, it would be remarkable indeed if one did not reach the same conclusions that these distinguished workers reached. However, if one examines a very large series of specimens from Florida and Texas through both coasts of Mexico and Central America, from Bermuda and the Bahamas through the Greater and Lesser Antilles to Trinidad and the northern South American coastal islands, and from Colombia, Venezuela, and the Guianas to Brazil, Peru, Ecuador, and the Galapagos and other islands off the western coast of Central and South America, one finds that there is no constancy in these segregated "species" or "varieties". Every intergradation can be found; nor are the extremes of form correlated with extremes in geographic range, as Humboldt & Bonpland imply. Were this so, varietal designations might still be very convenient and justi-

fied in spite of intergrading forms. Actually, however, all the extremes of form can be found in one and the same region. Humboldt & Bonpland's "guayaquilensis" and "cumanensis" are to be found in Yucatán just as well as the "campechensis" form. Similarly, Jacquin's glabrous and tomentose forms may be found not only in the same locality, but on the same tree and even on the same twig! The Roots, in their 1923 work, state "The leaves.....when they unfold are somewhat hairy, but later become bright green and shining above, paler or nearly white beneath."

Specimens which show all glabrous leaves include Jacquin's type of A. nitida at the British Museum and W. E. Broadway 5817 from Trinidad in the same herbarium (which, however, may represent A. schaueriana). Specimens which show both glabrous and pubescent leaves on the same twig include Fendler 1016 from Trinidad and Blanchet 328 from Brazil, both in the British Museum herbarium, while Luetzelburg 324a, from Brazil, exhibits, in addition, some leaves which are almost glabrous with scattered patches of furf. Gardner 1101, at the British Museum, shows the youngest leaves pubescent throughout on the under surface or only along the midrib, while the very large mature leaves are completely glabrous beneath.

Leechman 12, at Kew, has white-furfuraceous and glabrous leaves on the same twig and the two kinds are, in fact, adjacent pairs at the tip of the twig. It was collected on the seashore near Georgetown, British Guiana, in February, 1917. His no. 13 from the same locality and date shows only white-furfuraceous leaves. Both were identified as A. tomentosa by Leechman and annotated thus by Stapf. His no. 16, called "bush form" by him and found in strongly saline conditions of the Courida Swamp, Turkeyen, near Georgetown, exhibits both types of leaves on the same twigs, but has the blades more narrowly oblong. It was identified as A. nitida by both Leechman and Stapf. His no. 15, also referred to as the "bush form", but growing in fresh water conditions in the same swamp, is entirely white-furfuraceous. In both collections the petioles are extremely short and the leaf-blades narrowly oblong. His no. 14, identified as A. nitida by both Leechman and Stapf, has lanceolate blades and very long petioles, and is white-furfuraceous throughout. His no. 8 is said by Stapf to be the "nearest approach to Jacquin's Figure CXII.1 of Avicennia nitida (Sel. Stirp. Rar. Amer. Hist.)". On collection no. 14 the leaves (including their petioles) are 13--18 cm. long, while on no. 16 they are only 2--6.5 cm. long. No. 13 shows a pair of lower leaves sharply acute at the apex and precisely like A. marina var. acutissima Stapf & Moldenke in size, shape, and general appearance!

Sometimes there are two spikes in each axil or in some axils of a branch. Sometimes the spikes are so dense as to appear capitate on a long peduncle. Often the lowest pair of flowers is separated from the upper denser part of the spike by a short distance and is subtended by a pair of leaf-like, linear or oblong to spatulate, sessile bracts which are 4--17 mm. long.

A. germinans may be distinguished from A. schaueriana, with which it apparently grows in the southeastern portion of its range, by the following characters:

Corolla-lobes tomentose on both surfaces; leaf-blades mostly sharply acute at the apex; style elongated....A. germinans.

Corolla-lobes glabrous on the upper (inner) surface, tomentose outside; leaf-blades mostly rounded at the apex; style very short, the stigma subsessile.....A. schaueriana.

Perhaps it should be mentioned here, in passing, that it is not definitely established that Humboldt & Bonpland ever actually visited Campeche, as is implied by their variety "campechensis". A visit to this port is not recorded in any of the published accounts of their travels as far as I have been able to ascertain. However, in their "Flora Mexicana" [in H.B.K., Nov. Gen. & Sp. Pl. 7: 433-468. 1825] "Campeche" occurs at least 32 times as a locality for various species. Possibly someone sent them a collection of plants from this locality. The late Dr. John H. Barnhart, however, believed that they may have touched at Campeche very briefly either in early March, 1801, or sometime in 1804 while en route by ship to the more distant points as recorded in the accounts of their travels. Sprague, in his account of the localities in Mexico visited by Humboldt & Bonpland [Kew Bull. 1924: 24--27] has completely overlooked or deliberately ignored Campeche, probably indicating his belief that they did not ever visit there.

Edw. Palmer 484, Jurgensen 116, and Langlassé 146 -- all from Mexico -- have their inflorescences densely silky throughout, especially the bracts and rachis, but Ridley s.n., from Puerto Rico, is practically identical in this respect.

In all, 1834 herbarium specimens, including the types of all the names involved, and 19 photographs and mounted illustrations have been examined.

Millspaugh, in Field Columb. Mus. Publ. Bot. 2: 183 (1906) states that the species, in addition to the records cited below, was observed by M. A. Howe on New Providence, and by Britton & Millspaugh on Great Bahama, Great Harbor Cay, Frozen Cay, Ship Channel Cay, Great Guana Cay, and Exuma, in the Bahama Islands. On pages 191--245 (1907) he records it from the Marquesas Keys named A, B, C, D, E, F, G, H, and I.

Citations: FLORIDA: Brevard Co.: C. Atwood s.n. [January 10, 1917] (It); J. A. Harris C.19996 (H--4828); O'Neill 7117 (I), 7118 (I), s.n. [Cocoa, July 9, 1929] (W--1488524); Rhoads s.n. [Cocoa, 19 Oct. 1936] (Fl--12897, Fl--12898), s.n. [Cocoa, 22 Oct. 1936] (Fl--12896), s.n. [New Found Harbor, June 27, 1937] (H--50548); Rhoades & West s.n. [along Banana River] (Fl--21150). Broward Co.: Black 49-4362 (Be--45029). Collier Co.: A. S. Hitchcock s.n. [Marco] (F--232148). Dade Co.: J. G. Cooper s.n. [Cape Fla.] (C); W. Cooper s.n. [Cape Florida] (Br); H. C. Cowles S.27-1 (Cb--58183), s.n. [Miami, '06] (Ur); A. P. Garber s.n. [Miami, June '77] (F--311807, Pa, Vt); A. S. Hitchcock 1493

(F--233567), 1494 (F--233568); R. E. Matthews 17679 (Kr); B. Mc Allister 330 (H--41468); E. J. Palmer 27497 (E--931157); C. Skottsberg s.n. [16/5/1935] (Go); Small & Carter 806 (N), s.n. [Oct. 28th to Nov. 28th, 1903] (F--172377), s.n. [Shore, Miami] (W--962598); Spalding s.n. [Miami, Feb. 26, 1902] (Mi), s.n. [Miami, March 1902] (Mi); H. J. Webber 277 (F--228487). Flagler Co.: P. O. Schallert 20760 (Ur). Hillsborough Co.: Collector undesignated s.n. (Pr); Herb. Hooker s.n. [Tampa Bay] (K); Leavenworth s.n. [Tampa Bay, 1839] (C); Rolfs 248 (E--118568, F--228441, Fl--21152). Indian River Co.: Curtiss 1972 [fls. July & fr. Sept.] (B, Bm, Cm, E--874197, F--148252, Gg--163146, I, K, Mi, Mu--1661, Pa, Up--17069, Up--17070, Vt, Vu, W--59348, X), s.n. [Indian River] (N). Lee Co.: A. A. Eaton 1102 (F--166972, K, Oa); A. S. Hitchcock 270 (E--118569, F--101339, It, N, W--387304), s.n. [Myers, July-Aug. 1900] (Ka--62258), s.n. [Punta Rassa] (F--232278); O'Neill s.n. [Pepper Hammock] (Fl--21149); P. C. Standley 12790 (W--896251), 18995 (W--1028773), 57718 (F--918747); H. J. Webber 195 (F--228443); Wilbur & Webster 2525 (N). Levy Co.: A. W. Chapman 47 (W--59349); Godfrey & Redfearn 52828 (N); G. S. Miller 338 (W--1287725). Manatee Co.: Cuthbert 1356 (Fl--21147, Fl--21148), s.n. [June 23, 1916] (Fl--21146); Nash 2450 (B, Cb, Cl, E--118570, Ed, Es, F--48602, K, Mi, Mn--15354, N, P, Vu, W--252003); Rothrock 125 (Up--38261); J. H. Simpson 80 (Ca--220823, F--231176, W--334985); Tracy 6532 (N), 6772 (N). Martin Co.: C. Atwood s.n. [January 10, 1917] (Ob--200558). Monroe Co.: Bailey & Bailey 6107 (Ba); G. L. Bates 106 (Ob--50620); E. Scull s.n. [White Water Bay] (Fl--27572). Pinellas Co.: McFarlin 3688 (Mi); O'Neill 7115 (I); B. H. Patterson s.n. [St. Petersburg, Jan. 1918] (Cm). Sarasota Co.: Lochler s.n. [Sarasota Bay, 1884] (W--771901); B. H. Patterson s.n. [Jan. 20, 1918] (Cm); Weed s.n. [Englewood, April 23, 1939] (F--1019774). Volusia Co.: Haynie s.n. [4 July 1950] (Ur); H. N. Moldenke 21515 (Hk, Z); Spalding s.n. [New Smyrna, March 1902] (Mi); H. J. Webber 483 (E--118575). County undetermined: Bultman s.n. [Ocean Beach, Aug. 24, 1916] (Ar--1808); Cabanis s.n. [la. 26, east Fla.] (B, B, B); A. W. Chapman s.n. [south Florida] (C), s.n. (P); M. C. Reynolds s.n. [July--Oct. 1874] (Vt); Rugel 239 (E--118571, W--512163), s.n. (E--118572); J. H. Simpson 25 (W--59345), s.n. [Fla. 1890] (Du--90929, F--231367, W--59346). Anastasia Island: J. D. Smith s.n. [March 10, '79] (W--1323384). Ballast Key: Lansing 2306 (F--156770). Big Pine Key: Killip 32021 (N); O'Neill 7116 (I). Biscayne Key: H. J. Webber 273 (E--118574). Boca Chica Key: Bowman s.n. [Boca Chica, June 18, 1915] (Up--65333). Boca Grande Key: Lansing 2286 (F--156749). Cedar Keys: A. W. Chapman 47 (W); A. P. Garber s.n. [Cedar Keys, April 1876] (C, F--139479, Pa, W--265078), s.n. [Cedar Keys, Oct. 1877] (Pa, Vt); F. Walker s.n. [Cedar Keys] (I).

Elliott's Key: Small & Nash s.n. [Elliott's Key, Nov. 6 & 7. 1901] (Ar--7508, N). Key C: Lansing 2370 (B, F--156835). Key Largo: A. S. Hitchcock s.n. [Planters, June--July 1898] (F--231524), s.n. [Planters, April 1903] (F--231428); H. N. Moldenke 5819 (N, N); E. Scull s.n. [Key Largo, 8/25/37] (Bt--45936); Wolfe s.n. [Key Largo] (Fl--11783). Key West: Blodgett s.n. [Key West] (T); A. P. Garber s.n. [Key West, Aug. 1877] (Pa, Vt); A. S. Hitchcock s.n. [Key West, March 28--30, 1906] (F--230279); Lansing 2010 (F--156469); Edw. Palmer 403 (F--24878, Pr, W--59344), 6461 (E--116195); C. Skottsberg s.n. [Key West, 17/5/1935] (Go). Little Pine Island: H. N. Moldenke 929 (B, E--1002090, Go, H--5416, K, K, N, S, Up, W--1581794). Long Bush Key: Tandy 1261 (Bm). Long Key: Harshberger s.n. [Long Key, Dec. 29, 1910] (N, Up--63083); F. L. Lewton s.n. [Long Key, Aug. 6, 1894] (N). Man Key: Lansing 2335 (F--156799). Marquesas Keys: Lansing 2101 (F--156561, N), 2165 (F--156627), 2191 (F--156653), 2217 (F--156681), 2235 (F--156699, N), 2242 (F--156706), 2256 (F--156720), 2429 (F--156894, N). Merritt's Island: Mulvania s.n. [Merritt Island, July 12, 1930] (Hp); Rhoads s.n. [Merritt's Island, 28 June 1936] (Fl--12847). Newfoundharbor Key: W. R. Taylor 9365 (Up--75563), s.n. [Newfound Harbor Key, June 1, 1925] (Po--174964). Perico Island: Tracy 6772 (Bm, Cb, Ed, V). Sanibel Island: A. S. Hitchcock s.n. [Sanibel] (F--232079). Sarasota Keys: A. P. Garber s.n. [Keys Sarasota, May 1876] (Pa). Sugarloaf Key: F. W. Pennell 9574 (N). Thousand Islands: A. W. Chapman 46 (W--59347). Totten's Key: Small & Nash s.n. [Totten's Key] (N). Woman Key: Lansing 2410 (F--156875). MISSISSIPPI: Hancock Co.: Sanger s.n. [Bay St. Louis, Sept. 1916] (N). LOUISIANA: Jefferson Par.: L. E. Fox 2003 (Nc). Orleans Par.: Herb. Nuttall s.n. [New Orleans] (Bm); Nuttall s.n. [New Orleans] (K). Plaquemines Par.: Penfound s.n. [Nov. 26, 1938] (Tl). Terrebonne Par.: Lloyd & Tracy 249 (N). Caillou Island: Tharp s.n. [7-25-29] (Au), s.n. [Caillou Isl.] (Au). TEXAS: Cameron Co.: Clover 1251 (Mi, N); Muenschner & Winne 15577 (It); H. B. Parks 1724 (Au), s.n. [3-4-1940] (Tr--24067, Tr--24068, Tr--24072); R. Runyon 1420 (Rr, W--1567949), 2173 (Rr), 4031 (Au, S); Schott 139 (F--42568, T), II.139 (F--41304). Jefferson Co.: Tharp s.n. [7/29/39] (Au). Nueces Co.: Tharp s.n. [Port Aransas, 7/2/39] (Au, Au, Au, Gg--316189, Mi, N, N, N, Va). Brazos Santiago Island: R. Runyon 2077 (N), 2812 (N, N). Clark Island: Clover 715 (Au, Fs, Mi); Lundell & Lundell 8760 (Mi, N, N). Harbor Island: Whitehouse s.n. [April 16, 1933] (Au). MEXICO: Baja California: T. S. Brandegee s.n. [Magdalena Bay, Jan. 13, 1889] (Ca--104997, Du--205120), s.n. [January 1889] (Du--9532), s.n. [La Paz, Nov. 2, 1890] (Ca--104995); Collins, Kearney, & Kempton 137 (W--1530536); Diquet s.n. (N); Ferris 8680 (Du--214060, N, Po--210781,

W--1620715); H. S. Gentry 3689 (Ge); E. B. Higgins s.n. [Nov. 8, 1952] (Le); I. M. Johnston 3045 (Gg--31954), 4089 (Ca--251799, E--913191, Gg--31959, K, W--1316599), 4293 (Ca--251802, Gg--31955, K, S, W--1316681); H. L. Mason 1909 (Du--168457, F--716286, Gg--146788, K); Edw. Palmer 104 (W--59350); J. N. Rose 16718 (N, W--638747); Shreve 6516 (Me), 7099 (F--892876, Fs); Wiggins 5455 (Du--266005, Gg--292589, Gg--305140, It, N, Rs--30717, Se--82623, Ut--19669b). Campeche: Bonpland s.n. [Campeche] (N--photo, P, P, P, S--photo, Z--photo); Liebmann 11182 (W--1315033); Linden s.n. [Mai 1839] (S), s.n. [1840] (Cb), s.n. (P); Steere 1751 (Gg--208903, Mi). Chiapas: Matuda 2728 (Mh, Mi, N, N). Hidalgo: Collector undesignated s.n. [Regla] (Cp, Cp). Michoacán [or Guerrero]: Langlassé 146 (B, Cb, Cb, K, Me, Me, W--385751). Nayarit: Ferris 5396 (Du--150141, W--1492026); J. Gonzalez Ortega 5537 (Du--173327, K, Mu, W--1207567); Mexia 1008 (Ca--349978, Gg--154968, Gg--163701, Po--172716, W--1318663). Oaxaca: L. H. Bailey 608 (Ba); Elmore D.22 (N); Jurgensen 116 (Cb); Morton & Makrinus 2624 (Fs, K, W--1585614). Sinaloa: J. Gonzalez Ortega 4107 (N, W--1083842), 5181 (W--1165277), 6458 (Gg--202807); Herb. Com. Catast. Est. Rec. Nat. Estado 1131 (W--1014158); Edw. Palmer 228 (Cp, Mi, S, W--398867); Rose, Standley, & Russell 13309 (N, W--636140), 14046 (E--895334, F--704298, W--636904). Sonora: T. S. Brandegee s.n. [Guaymas, May 12, 1892] (Ca--104997); Coville 1668 (W--398091); Drouet & Richards 3542 (F--1014246); I. M. Johnston 3288 (Gg--31957, W--1316302); G. Lindsay 1154 (Du--259262); Mallery & Turnage s.n. [Sargento Point, May 2, 1937] (Du--253338, Fs); Maltby 185 (N, W--314930); Rose, Standley, & Russell 12578 (N, W--635392); Shreve 6120 (Fs); Wiggins 6341 (Du--216070). Tamaulipas: Fournier s.n. [Tampico, Juin 1838] (P); Maury 6469 (Me); Edw. Palmer 484 (Bm, Cb, Cb, E--777509, E--777510, F--436421, K, N, Up--73900, W--463399, W--463400, W--463401). Yucatán: G. F. Gaumer 619 (E--118580, F--36422, Us), 635, in part (B, Bm, Cp, E--118579, F--36438, G, Gg--159697, K, N, S, Us, V, W--268722, X); Gaumer & sons 23340 (Cb, E--804668, F--446837, G, N, Oa, S, Ur, W--842318); Lundell & Lundell 8140 (Mi, Mi, N); Reiche 978 (Mu, Mu), s.n. [Progreso, 1927] (Mu); Schott 361 (F--40714), 473 (F--40347, W--59351), s.n. [Sisal, Yuc.] (E--118581); Steere 3092 (E--1087225, Mi), s.n. (Me). State undetermined: Beechey s.n. (S); Galeotti 2686 [Pacific coast; Herb. Reichenbach f. 123583 & 156396] (Br, F--588476, P, V, V); J. Gregg 1123 (E--118582); Herb. Hooker s.n. [Puebla Viejo, Zienaga, Julio] (K); Pavon s.n. [N. E.] (Bm); Sessé, Mocino, Castillo, & Maldonado 2188 (F--847126, N--photo, Q, Q, Z--photo). PICHILINQUE ISLAND: J. N. Rose 16516 (N, W--638565). CORONADOS ISLAND: I. M. Johnston 3758 (Ca--251800, Gg--31958, K, S, W--1316485). CARMEN ISLAND: I. M. Johnston 3821 (Ca--251801, Gg--31956, K, W--1316502); J. N. Rose 16636 (N, W--638673). MANGROVE ISLAND: J. N.

Rose 16309 (N, W—638370). TRES MARIAS ISLANDS: Maria Magdalena: H. L. Mason 1793 (F—600495, F—716304, Gg—149413, K, N); O. Solis 9 (Me). COZUMEL ISLAND: G. F. Gaumer 146 (B, G, K), s.n. [Cozumel I.] (Pa); Goldman 653 (F—281308, W—397023). GUATEMALA: Escuintla: G. Salas 367 (W—1167793); J. D. Smith 2510 (B, G, K, N, W—59352, W—1323379); P. C. Standley 63975 (F—985269). Iza-bal: P. C. Standley 72167 (F—987991, N). Retalhuleu: P. C. Standley 66563 (F—987479), 87592 (N). San José: Kellerman 4566 (W—399620); Maxon & Hay 3659 (W—473599). San Marcos: Steyermark 37803 (F—1060792). Province undetermined: Friedrichsthal 250 (V), 1186 [Lapante] (V), 1256 [Lapante] (V), 1856 [Lapante] (V), s.n. (K, X). BRITISH HONDURAS: Cook & Martin 15 (W—1084552); Gentle 64 (F—713636, Mi, N, S), 4719 (N), s.n. [Lundell 4719] (I, Mi); Hummel 105 (K); C. L. Lundell 4131 (La, Mi, N), 7009 (Au, Au, Du—289876, I, Mh, Mi, N, S); Peck 399 (B, G, N); Schipp 625 (B, Bm, Ca—426846, Cb, E—990119, F—712207, G, K, Mi, N, S). BAY ISLANDS: Holbox: G. F. Gaumer 16026 (Sg), s.n. (K). EL SALVADOR: Ahuachapán: Padilla 332 (W—1168506). La Paz: Choussy 1593 (W—1168785). La Unión: P. C. Standley 20786 (W—1136613). Sonsonate: P. C. Standley 21889 (W—1137644). COSTA RICA: Alajuela: Brenes 3866 [204; 4] (F—851722, N); Hoffmann 294 (B, B, Bm), 295 (B). Guanacaste: Cook & Doyle 743 (W—474660); Ørsted 11181 (Cp); H. Pittier 2813 (Bm, Br, Br, Mu—3788, P, W—1323383). Puntarenas: Maxon & Harvey 7841 (W—1181541); Orozco 466 (F—1010885); H. Pittier 7109 [Herb. Inst. Physico-geogr. Nat. Costaric. 10060] (B, X), 7110 [Herb. Inst. Physico-geogr. Nat. Costaric. 10060] (B, X); Stork 4037 (F—698872); Tonduz s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 10060] (X, X), s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 10066] (V, X). Province undetermined: Liebmann 11182 [Laguna colorado] (Cp). CABELLO ISLAND: Brenes 15696 [228; 229] (F—857974, N, N). PANAMA: Bocas del Toro: Cooper & Slater 81 (W—1317502). Canal Zone: P. H. Allen 1724 (N, N); Hayes 643 (T); H. Pittier 4969 (Cp); P. C. Standley 30889 (W—1219575). Coclé: H. Pittier 4969, in part (W—715143). Colón: Cowell 97 (N); Lay & Collie s.n. [San Blas] (Bm); H. Pittier 4116 (N, W—679213). Panamá: N. J. Anderson s.n. [Panama] (S). Province undetermined: Billberg s.n. (S); Duchassaing s.n. [1851] (P); Hayes s.n. [June, 1861] (Bm); Seemann s.n. (Bm). TABOGA ISLAND: H. Pittier 3614 (W—678672). PEARL ISLANDS: San José: C. O. Erlanson 120 (N). BERMUDA ISLANDS: Main: Brown & Britton 103 (F—203721, K, N, Up—45678, W—524818); Collector undesignated s.n. [1842] (Ed, Ed); F. S. Collins 257 (B, F—464804, K, N, P, V, W—717553); Degener 1294 (Gg—318668), 17853 (N), s.n. [July 7, 1921] (It), s.n. [Hungry Bay, July 20, 1921] (Ms); Degener & McCallan s.n. [Hungry Bay, July 7, 1921] (Ba);

Flynn s.n. [Mar. 22, 1910] (N); Harshberger s.n. [6/12/05] (Up—39495, W—847492); Herb. Rein s.n. [1861—1863] (B); Lefroy 120 (K); A. H. Moore 2937 (F—190012, Mi); Moseley s.n. [Challenger Exped.] (Bm, Bm, Ed, Ed, K, P); Rankin s.n. [June 23, 1897] (Pr); Setchell & Setchell s.n. [St. George's, June 8, 1921] (Ca—213489).
 BAHAMA ISLANDS: Abaco: Brace 1849 (E—118583, F—183870, W—849122). Andros: Northrop & Northrop 593 (B, C, F—130682, K, X); Small & Carter 8771 (F—283770, K, N, W—758148). Crooked Island: Brace 4731 (F—199820, N). Easter Key: Howard & Howard 10205 (N, N). Fortune Island: A. S. Hitchcock s.n. [Fortune, XI.1890] (F—175459), s.n. [Fortune Is.] (E—47479). Inagua: Nash & Taylor 1326 (N). Mariguana: P. Wilson 7452 (F—221567, K, N). New Providence: C. F. Millspaugh 2482 (B, F—173173). Salt Key: P. Wilson 8101 (F—246498, K, N). South Bimini: C. F. Millspaugh 2396 (F—156365).
 TURKS & CAICOS ISLANDS: Grand Turk: Nash & Taylor 3823 (N). CUBA: Camagüey: Shafer 1124 (B, N, W—659550), 2545 (Bm, F—251062, F—286063, N, P, W—697266, W—848764), 2630 (Bm, F—251139, N, P). Havana: Acuña & Pujals 18966 (Es); Baker & Wilson 2310 (B, Po—63524), 2366 (B, Cp, Po—63522); Boldo 54 (Q); De la Ossa s.n. [1825] (Dc, Dc); Delessert s.n. (Cb); Ekman 456 (S); A. S. Hitchcock s.n. [Batabano, March 1906] (F—229655); León 2521 (Ha, N), 16108 (N, N, N), s.n. (Vi—1197); Marie-Victorin 58159 (Vi—25997, Vi—25998); Morales & Bosque 323 (B); Pavon s.n. (X, X); Ponce y Ramos s.n. [Herb. Roig 300] (Es); Rutten & Rutten-Pekelharing 7 (Ut); Shafer 116 (Cm, Es, Es); Van Hermann 909 (Bm, F—183651, K, N, P). Las Villas: Combs 80 (B, E—118586, F—16735, F—357901, Io—1039, K, Ka—61094, N); R. A. Howard 4940 (N, N, Um—48519, Ur—71289a), 5469 (N); J. G. Jack 4502 (B, K, P), 5008 (K, P), 5254 (P), 5683 (Ha), 7725 (B, Ba, Mi, S); Luna 987 (Ha); Singleton 405 (Oa). Matanzas: Britton, Britton, & Shafer 228 (Cm); Fortún & Matural s.n. [Herb. Roig 3376] (Es—8578, Es); Rutten & Rutten-Pekelharing 219 (Ut). Oriente: Clément 2915 (Ha, N); Earle 89 (N); Eggers 4773 (B, K); Ekman 7982 (N, S); S. H. Hamilton 40 (N); C. F. Millspaugh 1009 (F—61009), 1019 (F—61019); Underwood & Earle 1657 (N). Pinar del Río: Roig 1102 (Es), 1681 (Es), s.n. (Es—6351); Roig & Chrysler s.n. (Es—8616); Rutten & Rutten-Pekelharing 564 (Ut—60494a); Vásquez s.n. [Herb. Roig 3689] (Es), s.n. (Es—8800). Province undetermined: Guio 59 (Q); Herb. Jamain s.n. (V, V); Sagra 212 (K), s.n. (B, P, V); C. Wright 3182 [1860—1864] (Bm, E—118585, Os, P, X). ISLA DE PINOS: Curtiss 312 (B, Bm, Cb, Cm, E—118584, Es, F—165223, It, K, Le, Mu—3992, N, P, Vt, W—521930); Jennings 115 (Bm, Cm, It, N, W—1045875), 254 (Cm, N), 693 (Cm, It, N, W—1045927); Marie-Victorin & Alain 210 (Vi, Vi). CAYMAN ISLANDS: Grand Cayman: Kings G.C.255 (N), G.C.270 (N). Little Cayman: Kings L.C.28 (N). JAMATCA: Arnott

s.n. (K); P. Browne s.n. [Herb. Linnaeus G.813, S.2] (Ls, N--photo, Z--photo); Campbell 5848 (B); Dancer s.n. (K); B. M. Davis s.n. [Clarendon, April 1926] (Mi); Distin s.n. (K); W. Harris 5751 (B, F--145515), 8190 (B, Bm, F--146517), 9222 (B, Bm, F--212238, N, W--524661), s.n. [11.8.1901] (Ol); Harris & Lawrence C.156 (Ur), C.1516 (W--794135), C.1518 (Ur); A. S. Hitchcock s.n. [Port Morant, 12-24-91] (E--118587), s.n. (F--228167); W. Hooker s.n. (P, P); Kidder s.n. [6 Mch. '85] (Oa--10754); Killip 89 (W--1045041); Lambert s.n. (Us); March s.n. [1858] (K), s.n. (N); Maxon & Killip 327 (F--500577, P, Ur, W--1046171); McDonnell 3026 (Bm); McFadyen s.n. (Le); Norman 159 (Bm); Parnell s.n. (Ed, Ed); Pessin s.n. [6/12/1919] (Ti); Shakespeare s.n. (Bm); Shreve s.n. [Port Henderson, Jan. 4, 1906] (Fs); Stearn 52 (S), 178 (Bm), 325 (Bm, S), 816 (Bm); Swartz s.n. [Jamaica] (S, S); Wiles s.n. (K); N. Wilson s.n. (Cl); W. Wright s.n. (Bm); Yuncker 17136 (S), 17290 (S), 18159 (S). PIGEON ISLAND: G. R. Proctor 11493 (Bm). GREEN ISLAND: Stearn 287 (Bm). HISPANIOLA: Dominican Republic: W. L. Abbott 2735 (W--1145603); Eggers 2726 (B, C, Vu, W--1323375); C. A. Ehrenberg 376 (B); Ekman H.14750 (B, N, S); Fuertes 308 (B, Cb, Cb, Cb, Cb, Ed, Ed, N, P, P, Ut, V, W--658300), 1110 (B, Cb, Cb, Ed, Ed, N, P, Ut, V, W--698153); Jacquemont s.n. [St. Dominique, 1827] (K), s.n. [St. Dominique] (P, P, P); Paul, Duke of Wurtemberg s.n. [St. Domingo, 1830] (Mu--1691, Mu--1692); Rittrér s.n. [1823] (V); Scarff s.n. (V--35405); N. Taylor 91 (N). Haïti: Buch 583 (B); Collector undesignated s.n. (B, P, T); Ekman H.8054 (B, Ca--608043, F--839480, Mi, S, W--1412889); Eyerdam 188 (Se--20903, W--1303281), 20903-2 (Se--32034); Holdridge 1064 (N); Jäger 87 (B, Br, C, Cl, Cl, Le, P, S, V, Vu, W--249137), s.n. (Bm, Cp, W--597762); E. C. Leonard 2757 (Bm, F--505848, W--1075001), 5091 (F--505938, W--1077673); Leonard & Leonard 11635 (W--1450552), 15307 (W--1453578); G. S. Miller 281 (W--1148185); Nash 292 (F--158753, N); Picarda 319 (B), 1399 (B); Poiteau s.n. [1802] (Cb), s.n. (P); Prax s.n. [1854] (B); L. C. Richard s.n. (P, P); W. Schumann 330 (B). BEATA: R. A. Howard 12412 (N). GONAVE ISLAND: E. C. Leonard 3124 (B, W--1075381), 3311 (N, W--1075606); Prax s.n. [Mai 1854] (P, P, P), s.n. [1855] (P, P). PUERTO RICO: L. H. Bailey 69 (Ba); Barrus 89 (It); Bertero 108 (B); H. T. Cowles 2535 (Ms); E. E. Dale s.n. [May 23, 1926] (Mi, Mi); Goll 1063 (W--409590--photo), s.n. [Cataño] (W--429930--photo); Heller & Heller 373 (B, Bz--17108, F--119655, It, K, Lu, N, Us, W--425833); Johansen s.n. [Dec. 1916] (Oa); J. R. Johnston 839 (W--759066); Krug 901 (B); Laubengayer s.n. [March 2, 1929] (It); Otero 675 (Bt--52548); Ridley s.n. (Cb); Schwanecke 66 (B), 76 (B); Sintenis 723 (B, Cb, K, Lu, Mu--1662, S, W--1323376, X), 723b (B, Bm, N, W--1323374), 4893 (B, Bg, Bm, Cb, K, Le, Lu, V,

W-403368); Stahl 810 (B); J. A. Stevenson 426 (W-1475382).
 RATONES ISLAND: C. F. Millspaugh 657 (F-60657). VIEQUES: Shafer 2783 (F-415042, Gg-31960, N, W-790627), 3015 (N, W-790412).
 CULEBRAS: C. F. Millspaugh 582 (B, F-60582, N), 582 bis (F-60582). VIRGIN ISLANDS: St. Croix: Berg s.n. [Ins. St. Cruc.] (Lu); Børgesen s.n. [20.1.1906] (Bg); Collector undesigned s.n. (Cp, Ol); Herb. Hornemann s.n. (Cp); Herb. Hort. Bot. Haun. s.n. [St. Croix] (Bz-17107); Herb. Mus. Bot. Lund. s.n. [Ins. St. Crucis] (Lu); Ravn s.n. (S); A. E. Ricksecker 287 (B, Ca-473017, Du-210264, E-118588, F-70648, Le, N, Ob-14851, W-278173); L. A. Ricksecker 263 (B, E-118589, Ed, Ed, F-87893). St. Thomas: Børgesen s.n. [1/1896] (Mu-3731); Collector undesigned 159 (Q); Eggers 203 (Pa), 207 (B, B, Br, Ca-453446, Cb, Cb, Gg-31953, K, Le, Mu-1713, P, V, Vu, X), 670 (P); C. A. Ehrenberg 255 (B); Herb. Bonpland s.n. (B); Herb. Ventenat s.n. (Cb, Cb); Holton 515 (Cl, K, T); Kuntze 180 (N); Ledru 187 (P), s.n. [St. Thomas] (Ed, Ed); C. F. Morrow 90 (W-1146730); Riédle s.n. (P, P); Schomburgk s.n. [St. Thomas] (N); West s.n. (Dc); Wydlar 14 (B, Cb, Cb, Dc), s.n. (Le, V). Tortola: Fishlock 218 (K, N). LEEWARD ISLANDS: Antigua: Box 1356 (N); J. W. Gregory s.n. (Bm); Wullschlägel 438 (Mu-1085, V). Five Islands: Box 1356 (Bm). Guadeloupe: Bertero s.n. (Dc); Duchassaing s.n. (V); Duss 2942 (B, E-202762, N), 4132 (B); Forsström s.n. [Guadeloupe] (S); Grisebach s.n. [Guadeloupe] (E-118590); Imray s.n. (K); L'Herminier s.n. [1822] (Dc), s.n. [Guadeloupe] (X, X, X); Perrottet s.n. [16 Juin 1824] (Dc), s.n. [25 Juin 1824] (Cb, Cb); Quentin 160 [Duss 470] (P, P); L. Rodriguez 2930 (P, P); Stehlé 148 (N), 212 (S). Montserrat: Shafer 423 (Cm, F-294067, N, W-695376). St. Bartholomew: Euphrasén s.n. (Th); Forsström s.n. [St. Bartholomew] (S, S); Goës s.n. (B, S); Herb. Mus. Bot. Lund. s.n. [St. Barth.] (Lu), s.n. [Barthelem.] (Lu), s.n. [B.] (Lu). St. Kitts: Britton & Cowell 248 (B, K, N, W-419920). St. Martin: Boldingh 2498b [1627] (Ut), 2911b [2011] (Ut), 3026b [2074] (Ut); Suringar s.n. [3.V.1885] (B, Le, Le). WINDWARD ISLANDS: Bequia: Joseph B. 65 (Bm, Ed, Ed). Grenada: W. E. Broadway s.n. [Woburn, March 17, 1905] (F-175982, N, W-848973), s.n. [March 19, 1905] (Cb). Martinique: Bélanger 739 (P); Duss 1224 (B, W-849678); Egler 39-34 (N, N); Hahn 348 (Cb, Cb, K), 654 (X), 759 (B, Bm, Br, Cb, Cb, P, W-59353), s.n. [1871] (Cb), s.n. [Martini-que] (X); Plée s.n. (B, P); Sieber s.n. (V), Fl. Mart. 318 (B, B, Br, E-118591, K, Le, Mu-1074, Mu-1075, P, V, V, V, X); Terras-son 13 (P). St. Lucia: Anderson s.n. (K). St. Vincent: Caley s.n. (Cb); Guilding s.n. [1822] (K), s.n. (Br, K); Smith & Smith 546 (B, C). TOBAGO: W. E. Broadway 3786 (Le, Le, Le, Ut), 3878 (B); Eggers 5897 (B, C). TRINIDAD: L. H. Bailey 654 (Ba); Bailey & Bailey s.n. [Feb. 17, 1921] (Ba); R. E. D. Baker s.n. [Trin. Bot.

Gard. Herb. 14313] (R), s.n. [Trin. Bot. Gard. Herb. 14314] (R); Boccus s.n. [Trin. Bot. Gard. Herb. 12609] (N, R); N. L. Britton 2595, in part (N, R, W--1194444); Britton & Broadway s.n. [March 19, 1921] (R); E. W. Broadway 2562 (B, Cp, Ed, Ed, Ed, Ed, F--249004, Le, Le, Mi, Mu--4306, W--655639), 3199 (B, Cb, Cb), 5815 (S), 5817 (Bm, Bm, K, K), s.n. [Trin. Bot. Gard. Herb. 3505] (B, R), s.n. [Trin. Bot. Gard. Herb. 5535] (R), s.n. [Trin. Bot. Gard. Herb. 7340] (R), s.n. [Trin. Bot. Gard. Herb. 7837] (R); R. L. Brooks s.n. [Trin. Bot. Gard. Herb. 12655] (N, R); Crüger s.n. [July 16, 1861] (R); H. M. Curran 3 (F--452575, N, W--920310); Curran & Haman 1343 (N, P); Fendler 1016 (Bm, Ed, Ed, Ed, K, Ph); Forest Ranger s.n. [Trin. Bot. Gard. Herb. 11594] (R); W. G. Freeman s.n. [Trin. Bot. Gard. Herb. 9374] (R); Kuntze s.n. [IV. 74] (N); Lockhart s.n. (K); R. C. Marshall 11594 (K), s.n. [Trin. Bot. Gard. Herb. 12650] (N, R); Othmer s.n. (Mu--4054); Riédle 28 (P); Rutten-Pekelharing 320 (Ut); Swabey s.n. [Trin. Bot. Gard. Herb. 12560] (K, R), s.n. [Trin. Bot. Gard. Herb. 12879] (R), s. n. [Trin. Bot. Gard. Herb. 12906] (R); Trin. Bot. Gard. Herb. 2394 (R, W--1323373), 2401 (R), 3585 (W--1323386), 4590 (R), 5405 (B, R); E. Wall 67 (Go), s.n. [Asphalt Lake, 2/21/27] (Ew, Ew); Warming 202 (Cp, W--1324757); R. O. Williams s.n. [Trin. Bot. Gard. Herb. 11225] (R). BONAIRE: Boldingh 7462 (Ut), 7500 (Ut); Stoffers 925 (Ut--50764b), 937 (Ut--50760b). LOS ROQUES: Arraiz 1 (Ve), 2 (Ve). CURACAO: Arnoldo 2020 (Ut--18701b); Curran & Haman 84 (B, Bm, Ca--256151, K, P, S, W--1043960); Rose & Rose 22024 (W--763436); Suringar s.n. [12.I.1885] (B, Le), s.n. (Le). TORTUGA: Badillo 1222 (Ve--12628). MARGARITA ISLAND: J. R. Johnston 139 (B, Ca--146724, Cp, F--174529, K, Mu--4334, N, V, Vu, W--531968, W--962599, X). SAN ANDRES ISLAND: J. H. Hart 148 (W--1323385). WEST INDIES: Island undesignated: Collector undesignated s.n. (Ed, Ed, P); Eggers 102 (Mi); Euphrasén s.n. (S); Forsström s.n. [India occidentali] (Bm, S, S); Herb. Adanson s.n. (P, P); Herb. N. H. Bang s.n. (Cp); Herb. Gasström s.n. (S); Herb. Mus. Bot. Lund. s.n. [ex Antilles] (Lu); Ponthieu s.n. [Insulae Caribaeae] (Bm, Cb, S); L. C. Richard s.n. (Cb, Cb); Riédle 647 (P, P); Sieber s.n. [Indes occidentales] (Cp, X), s.n. (Ol); Smeathman s.n. [India occidentalis] (Bm); Swartz s.n. (S, S); Von Rohr s.n. (Cp). COLOMBIA: Antioquia: Haught 4855 (N); Wawra 20 (V). Atlántico: Elias 455 (S, W--1344952), 1156 (F--709840, N), 1494 (F--881180); Killip & Smith 21076 (F--638432, N, W--1356017). Bolívar: Billberg 51 (S, S), s.n. [Carthagenae, Nov.--Dec. 1825] (S), s.n. [Carthagenae] (B); Collector undesignated 51 (Lu); Cufodontis 35 (V); Dahl s.n. [Carthagenae] (S); G. Debeaux 73, in part (P), s.n. [Cartagena, 16 Avril 1877] (F--537911); Goudot s.n. [Cartagena] (X); M. L. Grant 10705 (W--2059689); F. W. Pennell

12005 (N); E. Wall 120 (Ew). Cauca: F. C. Lehmann B.T.691 (K, Le, N, V). Chocó: Killip & Cuatrecasas 39160 (W--1856215). Magdalena: Barclay 3144 (Bm); G. Debeaux 73, in part (V); Karsten s.n. [Sab-
anilla] (V), s.n. (V); Schultze 383 (B); H. H. Smith 420 (B, Bm, Br, Cb, Cb, Cl, Cm, E--118596, Ed, Ed, F--137478, K, Le, N, P, S, Ut, Vt, W--532954), 1937 (B, B, Bm, Br, Ca--584799, Cb, Cb, Cl, Cm, E--118595, Ed, Ed, F--138763, K, Le, N, P, S, Ut, Vt, W--533775). Nariño: Dryander 2613 (N, N, W--1838212); R. Espinosa 2959 (N). Valle del Cauca: Killip & Cuatrecasas 38660 (N). Depart-
ment undetermined: Dugand G.243 [80; La Plata; Yale Herb. 22532] (F--685464), 620 (F--727345); Goudot s.n. [1844] (P, P); Stübel 49 [La Boca] (B). VENEZUELA: Anzoategui: Tamayo 2070 (Ve--12632). Aragua: Ll. Williams 10423 (F--948397, F--986671, Ve--12635). Car-
abobo: Curran & Haman 1134 (Ca--254414, K, N, W--1011113, W--1043439). Delta Amacuro: Curran & Haman 1275 (N), 1275a (B, F--559672, N, W--1043156), 1321 (E--909196). Falcón: Curran & Haman 550 (W--1010898); Tamayo 893 (Ve--12629, Ve--12634, W--1778297). Miranda: Badillo 434 (Ve--12631); H. Pittier 11011 (Cb, N, P, P, Ve--12636, W--1187527). Sucre: Bonpland 68 (B); W. E. Broadway 528 (N, W--1188039); Chaper s.n. [1885] (P); Humboldt 68 (B, N--photo, Z--photo); Steyermark 62900 (N). State undetermined: Curran & Ha-
man 1242 (W--1011143); Mocquerys 829 (P, P, P); Otto 950 (B, B, B). BRITISH GUIANA: Archer 2625 (Ar--12015); W. H. Campbell 2 (Ed, Ed); Dahlgren & Persaud s.n. [Plu. Providence] (F--519858); De la Cruz 1090 (N, W--1069953), 3463 (Ca--300600, E--917780, F--544140, N); Fanshawe s.n. [Herb. Forest Dept. 6357] (Ut--13199b); S. G. Harrison 1534 (N), 1596 (N), 1673 (N), 1716 (N); Herb. Forestry Branch Dept. Lands & Mines 537 (K); A. S. Hitchcock 16565 (N, S, W--1055867); ImThurn s.n. (K); Jerman 4869 (C), 5468 (Bm, K, N), 5855 (K); Leechman 6 (K), 7 (K, N), 8 (K), 9 (K), 10 (K), 11 (K), 12 (K), 13 (K), 14 (K), 15 (K), 16 (K); Mell & Mell 248 (N, W--1481570); C. Parker s.n. [Demerara] (K); W. Parker 195 (Dc), s.n. [Demerari 1822] (Dc); Persaud 101 (F--532479), s.n. [Demerara, 1924] (F--550616, F--550617, F--550618); Rich. Schomburgk 845 (Bm, C, Cb, Cb, Cb, P, P, V, X), 845/1328 (K), 1328 (B), s.n. [1840--44] (Dr); Spruner s.n. [1846] (X, X); H. F. Talbot s.n. [1840] (K). SURINAM: Collector indig. Suriname 186 (Ut), s.n. (Ut); Col-
lector undesignated 21 (Le), s.n. [pr. Paramaribo] (B), s.n. (Ut); Florschütz & Florschütz 1927 (N, Ut--80114b); Geijskes s.n. [13, VI.1948] (Ut--13661b); Herb. Bosbeheer Suriname 137 (Ut--6268b), 1048 (Ut--10570b), 1049 (Ut--10571b), 1095 (Ut--29405b), 1096 (Ut--29404b), 1097 (Ut--29406b), 1404 (Ut--14152b), V.63 (Ut--82776b); Hostmann 457 (B, Bm, Cb, K, K, P, Ut, V, V, X), 1140 (Bm, Cb, E--118594, K, Ut, V, V, X), s.n. (Le); Hostmann & Kappler 528 (S), 1140 (S); Kegel 1023 (Gt); Lanjouw 646 [photo 153] (N, Ut),

1099 (Ut); Lanjouw & Lindeman 301 (N, Ut—17661b), 1352 (N, Ut—17660b), 1517 (N, Ut—17658b), 1518 (N, Ut—17657b), 1520 (N, Ut—17656b), 1521 (N, Ut—17659b); C. D. Mell 21 (W—1140395); Mennega 195 (Ut—81330b); Miquel s.n. [ad ripas flumin. Surinam] (K); Moldenke & Moldenke 19586 (Es, F, Fy, Lg, Mg, Mr, N, No, Ot, S, Sm, Ss, Vi); Plukenet s.n. [21.D.] (Le, Le); Soeprato 19f (Ut), 33 (Ut), 45h (Ut), 352 (Ut); Splitgerber 77 (Le), s.n. [Dec. 1837] (V), s.n. (P); Stahel 107 (Ut—71895a), s.n. [Sept. 2, 1934] (N, N, N, N, N); Tulleken 289 (Le), 304 (Le), 535 (Le, Ut); Weigelt s.n. [1827] (B, B, Br, Cb, Dc, Le, X), s.n. (Cp, V, V, V, V, V, V); Woodherbarium Surinam 107 (Be—38349, N); Wulfschlagel 412 (Br, V, V). FRENCH GUIANA: Benoist 22 (P, P, P); W. E. Broadway 691 (N, W—1068859); Collector undesignated 58 (Q), s.n. [Cayenne] (P, P), s.n. (Dc); Crévaux s.n. [Riviere de Kourou, Mars 1877] (P), s.n. (K); Degelius s.n. [Cayenne, 5/VI/1958] (S); Geay 1917 (P), 1935 (P), 1936 (P); Herb. Barbier s.n. [Guyane] (W—1123312); Leguillon s.n. [1857—59] (B); Leprieur s.n. [Guyane fr.] (P); Martin s.n. [Cayenne] (K); L. C. Richard s.n. [Cayenne] (P); Sagot 471 (Bm, K, P, P, P, P, P, P, V, V, X), s.n. [Mara, Avril 1854] (P); Soubirou s.n. (P, P, P). ECUADOR: Bolívar: R. Espinosa 2414 (N), 2450 (N). El Oro: A. S. Hitchcock 21104 (N, W—1196174); Hjerting & Rahn 653 (S). Esmeraldas: Harling 1696 (S); E. L. Little 6363 [Herb. U. S. Forest Serv. 98224] (It, N); Seemann 1106 (K). Guayas: N. J. Andersson s.n. [Guayaquil, 1852] (S); Asplund 15221 (S), 18188 (S); Bonpland s.n. [Guayaquil] (B, N—photo, P, P, P, P, Z—photo); Fagerlind & Wibom 87 (S), 114 (S); Gaudichaud 92 (B, Cb, Cb, Dc, P, P); Hall 13 (K); E. L. Little 6750 [U. S. Forest Serv. 98495] (N); Rimbach 54 [Yale Herb. 20747] (Ca—501845, Du—223846, F—690258), 56 (F—704880); Schimpff 379 (B, B, Cb, Cb, E—1088364, W—1619455); Spruce 6519 (Bm, Ed, Ed, K). Manabí: Asplund 16588 (S). Province undetermined: Mille 87 (N). PUNA ISLAND: N. J. Andersson 92 (S); Hinds s.n. [1841] (K). GALAPAGOS ISLANDS: Albemarle: A. Stewart 3266 (Gg—31947). Charles: Edmonston s.n. (K); A. Stewart 3267 (E—817127, Gg—31352, N, W—921580). Chatham: N. J. Andersson s.n. [Chatham, 1852] (Cb); Darwin s.n. [Chatham Isl.] (P); A. Stewart 3268 (Gg—31951). Duncan: A. Stewart 3269 (Gg—31949). Indefatigable: Chapin 1120 (N); J. B. Hicks 407 (Bm, K); Steindachner 50 (V), 51 (V); A. Stewart 3270 (E—817130, Gg—31943), 3271 (Gg—31945); T. W. J. Taylor T.T.91 (N). James: N. J. Andersson s.n. [Ins. James, 1852] (Br), s.n. [James Isl.] (S); L. E. Cheesman 385 (Bm, K); Snodgrass & Heller 368 (N, W—543105); A. Stewart 3272 (Gg—31946). Jervis: A. Stewart 3273 (Gg—31948). Santa Cruz: Rorud 205 (Ol); Schimpff 30 (B, Bm, Cb, E—1072247, N, P, S, Ut);

Von Hagen 8 (N, N, N), 80a (N), 80b (N), 80c (N); Wavrin s.n. (Br, Br). Seymour: A. Stewart 3274 (Gg—31944). South Seymour: Snodgrass & Heller 605 (Du—9533). Island undesignated: N. J. Andersson 120 (B, Cp, K, Lu, P, Us, Us, V), s.n. [Ins. Galapagos, 1852] (E—118609); Goodridge s.n. (Cl). PERU: Tumbes: Raimondi 2278 (B). Department undetermined: Pavon s.n. (Cb, P); Ruiz & Pavon 18/10 (F—845433). BRAZIL: Bahia: Blanchet 328 (Bm, Br, Cb, Cb, Cp, Cp, P, P), 1427 (Dc), s.n. [1832] (M); Collector undesignated s.n. (V); Luetzelburg 324a (Mu); Salzmann 431 (Dc—29), s.n. [1831] (Cb, Ed, Ed), s.n. [Bahia] (E—118593, K, K, P); Sellow s.n. [Vittoria et Bahia] (B). Ceará: Allemão s.n. (Ja—32258); Drouet 2442 (E—1110546, F—857471, F—949342, I, N, N, S, Sp—37514). Espirito Santo: Glaziou 4925 (B, Cp, Cp, P), 9988 (Cp, K, P), 11324 (B, Cp, K, P). Gofas: Brenning 952, in part (B). Maranhão: Brenning 952, in part (B); Ducke 402 (Bm, Cb), s.n. [Herb. Rio de Jan. 5405] (N); Fróes 1818 (B, Cb, E—1042064, K, N, P, S, Ut); Lisbôa s.n. [Herb. Rio de Jan. 4792] (B, Ut); Snethlage 241 (B). Pará: Black 48-3236 (N), 48-3237 (Be—37728, N), 48-3427 (Ut—74081b); Collector undesignated s.n. (P); Curran 16 (F—740465, S, W—1617777); Ducke 9818 [Herb. Rio de Jan. 5407] (N); Huber 1181 (X, X, X); Martius 2644 (Mu—1070), s.n. [Mart. 1820] (Mu—1072), s.n. [Aug.] (Mu—1071), s.n. [Sept.] (Mu—1069); Poeppig s.n. [Colares, Maio 1839] (V); N. T. da Silva 163 (Be—42567). Pernambuco: Curran 48 (F—740466, Ml, S); G. Gardner 1101 (Bm, Cb, Cb, Ed, Ed, K, K, N, P, P, S, V, V, V, V, W—1066491), s.n. [Pernambuco, 1837] (N); Sobrinho 287 (N, N, N). State undetermined: Boog s.n. (K); Freyreiss s.n. (S); Hornemann s.n. (Cp); Jobert 306 [Copacabana, bas Amazon] (P); Sellow 170 (B), 188 (B), 360 (B), s.n. [Brasilia] (B, K, S); Westin s.n. (N—photo, Th, Z—photo). MARAJÓ ISLAND: Black 48-3427 (Be—37915), 48-3487 (Be—37973). CULTIVATED: Guadeloupe: L. Rodriguez 3051 (P, P). LOCALITY OF COLLECTION UNDESIGNATED: Baudin s.n. (P); Boldo 55 [Cancy] (Q); Collector undesignated 87 (P), 177 [Herb. Linnaeus G.813, S.1] (Ls, N—photo, Z—photo), 370 (P), 1131 (Me), s.n. (C, Dc, P, V); Havn 779 (V); Herb. Coleman s.n. (S); Herb. Gasström s.n. (S); Herb. Jacquin s.n. (Bm, Bm); Herb. Link s.n. (B, B); Herb. Miller s.n. (Bm, Bm); Herb. Persoon s.n. (Le); Herb. Rottböll s.n. (Cp); Joor s.n. (E—118576, E—118577); Lambert s.n. [1816] (Dc); Née 56, in part (Q); Pflug s.n. [Am. mer.] (Cp, Cp); Pollart de Canidri s.n. (Br); Roxburgh s.n. (Ed); Schlechtendal 2143 (S); Von Rohr & Ryan s.n. (Cp, Cp). MOUNTED ILLUSTRATIONS: Krug, Icon. Pl. Portoric. pl. 99 (S); Lam., Tabl. Encycl. Méth. Bot. pl. 540 (Cb).

AYICENNIA LANATA Ridl., Journ. Fed. Mal. States Mus. 10: 151—152. 1920.

Synonymy: Avicennia officinalis var. spathulata Kuntze, Rev. Gen. Pl. 2: 502. 1891. Avicennia officinalis var. spathulata f. tomentosa Kuntze, Rev. Gen. Pl. 2: 502. 1891.

Literature: Kuntze, Rev. Gen. Pl. 2: 502. 1891; Ridl., Journ. Fed. Mal. States Mus. 10: 151--152. 1920; Hill, Ind. Kew. Suppl. 6: 23. 1926; J. G. Wats., Malayan Forest Rec. 6: 63 & 64. 1928; Hill, Ind. Kew. Suppl. 7: 23. 1929; Ridl., Dispersal Pl. 310. 1930; Moldenke, Geogr. Distrib. Avicenn. 33. 1939; Moldenke, Suppl. List Common Names 2, 9, & 24. 1940; Moldenke, Prelim. Alph. List Invalid Names 6. 1940; Moldenke, Alph. List Invalid Names 5. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 60, 61, 64, & 86. 1942; Moldenke, Phytologia 2: 92. 1944; Moldenke, Alph. List Cit. 1: 80 & 137 (1946), 2: 353 & 625 (1948), 3: 774 (1949), and 4: 1040, 1093, 1105, & 1110. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 138, 139, 145, & 174. 1949; Moldenke, Résumé 179, 236, & 440. 1959.

Large tree, to 26 m. tall; branchlets and twigs rather slender, very densely appressed-puberulent with sordid-grayish or brownish hairs, subterete or the youngest more or less tetragonal and sulcate in drying, not conspicuously lenticellate; nodes, especially on larger branchlets, swollen, conspicuously annulate and articulate; leaf-scars inconspicuous; principal internodes 1.5--8 cm. long; leaves decussate-opposite; petioles slender or rather stout, 5--16 mm. long, flattened above, longitudinally wrinkled beneath in drying, more or less densely pulverulent or pubescent like the twigs; leaf-blades firmly chartaceous, mostly thin-textured, bright- or dark-green and rather shiny above, flavescens or sordid-grayish beneath, elliptic or obovate, 6--9.7 cm. long, 3.3--5.5 cm. wide, rounded or bluntly subacute at the apex, entire, acute or acuminate at the base, obscurely pulverulent or glabrate and shiny above and not impressed-punctate, closely yellow-tomentellous or densely appressed-pulverulent-puberulent with sordid or (usually) flavidous furf beneath, rarely less conspicuously so in age, the margins not revolute; midrib slender, prominulent above and usually canaliculate for one-half its length or longer, rounded-prominent beneath, not extending through to the apex; secondaries slender, 4--7 per side, ascending, arcuate toward the margins, joined in many rather irregular loops several mm. from the margins, prominulent on both surfaces, often hidden by the furf beneath; vein and veinlet reticulation rather abundant, subprominulent on both surfaces or hidden by the furf beneath; inflorescence axillary and terminal, mostly paniculate-branched with about 3 very short capitately 1--3-flowered branches or in corymbose heads, in all 2--6 cm. long and 1--3 cm. wide; peduncles tetragonal and sulcate in drying, varying from yellowish-tomentellous to densely appressed-puberulent or short-pubescent with sordid-flavidous or brownish hairs, 0.9--2.5 cm. long; foliaceous bracts often present, 1 pair subtending the inflorescence-branches, densely tomentellous; flowers very agreeably fragrant; calyx-lobes tomentose on the outer surface; corolla glabrous within, densely hairy on the outside, its lobes strongly decurved or recurved;

filaments about the same length as the anthers; anthers dorsifixed, elliptic; style bifid, very short, brown, its lobes erect; ovary light-green, glabrous, but surrounded at the base by dense tomentum; fruiting-calyx practically unchanged, brown, densely appressed-puberulent; fruit sessile, ovate or ovoid, to 1.4 cm. long and wide, not beaked, very densely tomentose-lanate with sordid-flavitious or grayish hairs, apiculate.

The species is based on Watson & Burkill 3793, from the River Valley Road, Singapore, collected on August 9, 1918, Burkill 3797, from the same locality, collected on September 17, 1918, and J. G. Watson 2767 from Kuantan, Pahang, Malaya, deposited in the herbarium of the Royal Botanic Gardens at Kew. In the original publication the first two of these cotypes are cited as "Burkill & Watson 3793 and 3797". The Herb. Forest Dept. F. M. S. 2767, cited below, was misidentified by me in my Alph. List Cit. 2: 353 (1948) as A. nitida Jacq.

The type of A. officinalis var. spathulata and its f. tomentosa is Kuntze 6046, from Singapore, deposited in the Britton Herbarium at the New York Botanical Garden.

Common names recorded for A. lanata are "api-api bĕrbulu", "api-api puteh", "hairy api-api", and "white api-api". However, "api-api puteh" and "white api-api" are applied also to A. marina (Forsk.) Vierh. and to A. officinalis L. The species was erroneously recorded by me from British North Borneo in my Geogr. Distrib. Avicenn. 33 (1939) and Known Geogr. Distrib. Verbenac., [ed. 1], 64 (1942) and [ed. 2], 145 (1949). The Warburg 17522 from Amboina, originally annotated by me as A. lanata, is actually A. officinalis L., and the Loher 4450 from the Philippines is in part A. marina (Forsk.) Vierh. and in part A. marina var. rumphiana (H. Hallier) Bakh.

Ridley distinguishes his species from A. officinalis as follows: in A. officinalis the corolla-lobes [he says "calyx-lobes" by mistake] are patent but not recurved, the filaments are much longer than the anthers, the style is long and slender, and the flowers have an unpleasant smell; in A. lanata the corolla-lobes are recurved, the filaments are the same length as the anthers, the style is short, and the flowers are agreeably fragrant. Personally, I am not entirely convinced that the species are distinct. Mature flowers have not been available to me for examination. Without them it is impossible to tell if A. lanata is actually closely related to A. officinalis, as Ridley implies when he compares it only with that species, or whether it is not, rather, closely related to A. marina var. rumphiana. Tentatively, I have placed it in the Upata section of the key and in the small-flowered A. marina affinity. The few flowers that I have been able to measure did not appear to be very wide, but Ridley surely would have noticed flower-size when he compared his plant with the large-flowered A. officinalis, so I am allowing it to be reached in the key as both small-flowered and large-flowered.

Further study of fresh material is essential for the solution of this problem.

In all, 10 herbarium specimens, including the types of all the names involved, and 9 mounted photographs have been examined.

Citations: MALAYA: Malacca: Vesterdal 316 (Cp). Pahang: J. G. Watson 2767 [Herb. Forest Dept. F. M. S. 2767] (K--cotype, N--photo of cotype, Z--photo of cotype). Singapore: Burkill 3797 (K--cotype, N--photo of cotype, Z--photo of cotype); Curran s.n. [Singapore, Aug. 1910] (N--photo, W--90204, Z--photo); Kuntze 6046 (N); Nur s.n. [May 29, 1934] (F--752072, N); Watson & Burkill 3793 (K--cotype, Mi--photo of cotype, N--cotype, N--photo of cotype, Z--photo of cotype), 3795 (K).

AVICENNIA LANCEOLATA (Engelh.) Moldenke, comb. nov.

Synonymy: Jambosa lanceolata Engelh., Abh. Senck. Naturf. Gesell. 19: 35--36, pl. 9, fig. 6 & 7. 1895.

Literature: Engelh., Abh. Senck. Naturf. Gesell. 19: 35--36, fig. 6 & 7. 1895; Berry, Bull. Torrey Bot. Club 63: 65. 1936. Illustrations: Engelh., Abh. Senck. Naturf. Gesell. 19: pl. 9, fig. 6 & 7. 1895.

Engelhardt's description and discussion are worth repeating here: "Das Blatt ist lederig, lanzettförmig, zugespitzt, ganzrandig; der Mittelnerv ist kräftig, die Seitennerven sind schwach, gehen unter spitzen Winkeln aus, verlaufen etwas bogig und verbinden sich vor dem Rande zu einem Saumnerven untereinander. Nur Bruchstücke liegen vor, welche weniger gut als die Exemplare der meisten übrigen Arten erhalten geblieben sind, weshalb die feineren Nervatur nicht zu erblicken ist. Nur die für diese Blätter charakteristischen, durch die Mitte der Hauptfelder laufenden und vor ihrem Ende sich abwärts zu den unteren Seitennerven neigenden Nerven sind zu erblicken. Ich vergleiche die fossile Stücke mit kleineren Blättern der Jambosa vulgaris DC., bei welchen sich auf der Oberseite die Nervatur ebenfalls wenig ausgeprägt zeigt. Bei Avicennia tomentosa Jacq., an die man ebenfalls denken könnte, besitzen die Blätter eine viel ausgeprägtere Nervatur. Rührten unsere Stücke von dieser her, so wäre es unverständlich, wenn nicht einmal stückweise der feinere Geäder erhalten geblieben wäre."

The type of this species was collected by Friedrich Carl Lehmann at Santa Ana in the Cauca Valley, Colombia, in rocks of Tertiary age. Berry, in the reference cited above, says "What is almost certainly a second fossil occurrence of Avicennia may be seen in a form from the Tertiary of Colombia, which Engelhardt erroneously referred to the myrtaceous genus Jambosa Rumphius and compared with the Oriental Jambosa vulgaris De Candolle, extensively cultivated in tropical South America."

Personally, I see very few differences worth mentioning between the four so-called fossil species or between them and the present-day A. germinans. Certainly one could find leaves and fruit abundantly in the present-day A. germinans to match all

those illustrated for the fossil species. However, in deference to standard paleobotanic practice, I am retaining all of them as presumably valid taxa.

AVICENNIA MARINA (Forsk.) Vierh., Denkschr. Akad. Wissensch. Wien Math.-nat. 71: 435. 1907.

Synonymy: Sceura marina Forsk., Fl. Aegypt.-arab. 2: 37. 1775. Rack Bruce, Trav. Abyss. & Nub. 5: app. 44. 1790. Racka torrida J. F. Gmel., Syst. Nat. 2: 245. 1791. Halodendrum Thou., Gen. Nov. Madag. 8. 1806. Halodendron Roem. & Schult., Syst. Veg. 3: 485. 1818. Halodendron thouarsi Roem. & Schult., Syst. Veg. 3: 485. 1818. Racka ovata Roem. & Schult., Syst. Veg. 3: 207. 1818. Avicennia tomentosa L. ex Blume, Bijdr. Fl. Ned. Ind. 14: 821. 1826 [not A. tomentosa Blanco, 1845, nor Blume, 1918, nor Jacq., 1760, nor L. & Jacq., 1783, nor R. Br., 1851, nor G. F. W. Mey., 1818, nor Nutt., 1947, nor Nutt. & Br., 1832, nor Roxb., 1835, nor Schau., 1940, nor Sieber, 1844, nor Sw., 1864, nor Willd., 1800, nor Weigelt, 1851]. Avicennia tomentosa var. arabica Walp., Repert. 4: 133. 1845. Avicennia intermedia Griff., Trans. Linn. Soc. Lond. Bot. 20: 6, pl. 1. 1846. Halodendron thouarsii Roem. & Schult. ex Schau. in Mart., Fl. Bras. 9: 306, in syn. 1851. Avicennia tomentosa Wall. ex Schau. in Mart., Fl. Bras. 9: 306, in syn. 1851. Avicennia officinalis var. ovatifolia Kuntze, Rev. Gen. Pl. 2: 502. 1891. Avicennia officinalis var. ovatifolia f. flaviflora Kuntze, Rev. Gen. Pl. 3 (3): 249. 1898. Avicennia officinalis var. ovatifolia f. tomentosa Kuntze, Rev. Gen. Pl. 3 (3): 249. 1898. Avicennia mindanaense Elm., Leaflet. Philipp. Bot. 8: 2868. 1915. Avicennia sphaerocarpa Stapf ex Ridl., Journ. Fed. Malay States Mus. 10: 151. 1920; Fl. Malay Penins. 2: 642. 1923. Avicennia tomentosa Vahl ex Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 204, in syn. 1921. Avicennia marina var. typica Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 205. 1921. Racka torrida Bruce ex Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 205, in syn. 1921. Avicennia marina var. intermedia (Griff.) Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 211. 1921. Avicennia mindanaensis Elm. ex Prain, Ind. Kew. Suppl. 5: 27. 1921. Avicennia alba Wight ex Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 211, in syn. 1921 [not A. alba Blume, 1826, nor Karst., 1907]. Avicennia officinalis var. nigra Cowan, Rec. Bot. Surv. India 11: 203 & 220. 1928. Avicennia officinalis Maxim. ex P'ei, Mem. Sci. Soc. China 1 (3): 186, in syn. 1932 [not A. officinalis L., 1753, nor H. J. Lam, 1940, nor Millsp., 1930, nor Schau., 1856]. Trichorhiza lechenaultii Miq. ex Moldenke, Prelim. Alph. List Invalid Names 43, in syn. 1940. Avicennia marina var. marina (Forsk.) Bakh. ex Moldenke, Résumé 235, in syn. 1959. Avicennia lanceolata Willd., in herb. [not A. lanceolata (Engelh.) Moldenke, 1960]. Avicennia mariana Vierh., in herb. Avicennia racemosa Cornwell, in herb.

Avicennia nitida Thunb., in herb. [not *A. nitida* Jacq., 1760, nor Blanco, 1837, nor L., 1960, nor L. & Jacq., 1783, nor Rodsch., 1844, nor Sessé & Moc., 1894].

Literature: Forsk., Fl. Aegypt.-arab. 2: 37. 1775; Bruce, Trav. Abyss. & Nub. 5: app. 44--46. 1790; R. Br., Prodr. Fl. Nov. Holl., ed. 1, 1: 518. 1810; Lam., Encycl. Méth. Suppl. 1: 539. 1810; Roem. & Schult., Syst. Veg. 3: 34, 207, 485, & 519. 1818; Blume, Bijdr. Fl. Ned. Ind. 14: 821. 1826; Roxb., Fl. Ind., ed. 2 [Carrey], 3: 88. 1832; Wall., Pl. As. Rar. 3: 44, pl. 271. 1832; E. Mey., Comm. 277. 1837; Drège, Zwei Pflanzengeogr. Documente 159, no. 32. 1844; Walp., Repert. 4: 131. 1845; Hochst., Flora 28: 68. 1845; Griff., Trans. Linn. Soc. Lond. Bot. 20: 6 & 7, pl. 1, fig. 8 & 11. 1846; Griff., Ann. Sci. Nat. Bot., ser. 3, 7: 11 & 12, pl. 1, fig. 8 & 11. 1847; Schau. in A. DC., Prodr. 11: 699--700. 1847; Wight, Icon. Pl. Ind. Or. 4 (3): 12, pl. 1481. 1849; Schnitzlein, Iconogr. 2: pl. 137*. 1856; Harv. & Sond., Fl. Cap. 2: 513--514. 1862; C. B. Clarke in Hook. f., Fl. Brit. Ind. 4: 604. 1885; Watt, Dict. Econom. Prod. Ind. 1: 361. 1889; Kuntze, Rev. Gen. Pl. 2: 502. 1891; Jacks., Ind. Kew. 1: 254 & 1090 (1893) and 2: 679 & 822. 1895; Kuntze, Rev. Gen. Pl. 3 (3): 249. 1898; J. G. Baker in Thiselton-Dyer, Fl. Trop. Afr. 5: 331--332. 1900; J. Schmidt, Bot. Tidsskr. 26: 60--68 & 97, fig. 28--30 & 43 (8). 1904; J. Schmidt in Karst. & Schenck, Veget.-Bilder 3: pl. 38. 1906; Sim, For. Fl. Cape Col. 287, pl. 120, fig. 3. 1907; Vierh., Denkschr. Akad. Wissensch. Wien Math.-nat. 71: 435. 1907; Sim, For. Fl. & Res. Portug. E. Afr. 94--95, 119, 125, & 139, pl. 83. 1909; Engl. in Engl. & Drude, Veget. Erde 9 [Pflanzenwelt Afr. 1 (1)]: 2, 231, 233, & 1021, pl. 45, fig. 202. 1910; H. H. W. Pearson in Thiselton-Dyer, Fl. Cap. 5 (1): 225. 1910; Hayata, Acts Bot. Cong. Bruxelles 2: 68, pl. 12--14. 1912; Prain, Ind. Kew. Suppl. 4: 21. 1913; Bews, Journ. Ecol. 1: 75 (1913) and 2: pl. 22. 1914; Elm., Leaf. Philipp. Bot. 8: 2868. 1915; Kanehira, Formosan Trees 2, 15, 393, & 394. 1917; H. J. Lam, Verbenac. Malay. Arch. 341 & 361. 1919; Ridl., Journ. Fed. Malay States Mus. 10: 151. 1920; Engl. in Engl. & Drude, Veget. Erde 9 [Pflanzenwelt Afr. 3 (2)]: 661--679. 1921; Bakh., Bull. Jard. Bot. Buitenz, sér. 3, 3: 205 & 211, pl. 14--19. 1921; Prain, Ind. Kew. Suppl. 5: 27. 1921; Ridl., Fl. Malay Penins. 2: 642. 1923; Heyne, Nutt. Plant. Nederl. Ind. 1326. 1925; Hill, Ind. Kew. Suppl. 6: 23. 1926; Cowan, Rec. Bot. Surv. India 11: 203 & 220. 1928; J. G. Wats., Malayan Forest Rec. 6: 59 & 60. 1928; Hill, Ind. Kew. Suppl. 7: 23. 1929; Ridl., Dispersal Pl. 310. 1930; Troll & Dragendorff, Planta [Arch. Wiss. Bot.] 13: 330. 1931; Clason-Laarmon, Trop. Natuur. 21: 26. 1932; P'ei, Mem. Sci. Soc. China 1 (3): 186. 1932; Crevost & Pételot, Bull. Econom. Indochine 37: 1297. 1934; Junell, Symb. Bot. Upsal. 4: 140--143, 146, & 209. 1934; Schimper & Faber, Pflanzen-geogr., ed. 3, 1: 39 & 567. 1935; Dop in Lecomte, Fl. Gén. Indochine 4: 892. 1935; H. Walter, Bericht. Schweitz. Bot. Gesell. 46: 217. 1936; Walter & Steiner, Zeitschr. Bot. 30: 138--145, 155, 156, 158--161, 163, 165, 167--169, 175, 176, 178--180, 189, & 190. 1936; Moldenke, Geogr. Distrib. Avicenn. 29--35. 1939; Cormio, Avic. marina 1--11. 1939; Allen, Trop.

Woods 60: 59. 1939; Moldenke, *Alph. List Common Names* 3, 7, 17--19, 21, 22, 25--28, & 33. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 5, 6, 26, 39, 40, & 43. 1940; Moldenke, *Suppl. List Common Names* 2, 4, 7, 9, 11, 14, 15, 18, & 22--24. 1940; Moldenke, *Alph. List Invalid Names* 5, 25, 39, 40, & 44. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 45, 46, 49--61, 63--66, 68--71, & 86. 1942; Record & Hess, *Timbers New World* 72--73 & 593, pl. 14. 1943; Moldenke, *Phytologia* 2: 92. 1944; Roig, *Plant. Med. Cuba* 449. 1945; E. D. Merr., *Pl. Life Pacific World* 52, 53, 57, 58, 173, & 282, fig. 55. 1945; Moldenke, *Alph. List Cit.* 1: 2--5, 9, 13, 15, 16, 26, 29, 31, 33, 35--37, 42, 46, 48, 50--52, 54, 57, 77, 80--82, 97, 101, 104, 105, 107, 113, 114, 116, 122--124, 131, 137, 141, 153, 161, 164, 165, 183, 190, 191, 193, 196, 197, 202, 206--211, 220, 222, 227, 240, 244, 246--249, 254, 255, 262, 270, 271, 276, 277, 285, 315, & 316. 1946; Moldenke, *Alph. List Invalid Names Suppl.* 1: 2. 1947; H. N. & A. L. Moldenke, *Pl. Life* 2: 69. 1948; Moldenke, *Alph. List Cit.* 2: 337, 353--355, 358, 360, 403, 408, 411, 412, 416, 423, 424, 427, 433, 435, 437, 459, 462--464, 482, 497, 500, 501, 503, 504, 514, 528, 529, 536, 537, 554, 556--558, 560, 569, 572, 573, 576, 580, 581, 588, 601--604, 607, 608, 613, 614, 618--620, 625, 627, 629, 630, 634, & 644 (1948), 3: 655, 666, 670, 673, 700, 706--708, 723--725, 727, 728, 731, 737, 747, 761--764, 766, 774, 775, 794, 801, 803, 810, 811, 815, 816, 822, 824, 825, 827, 828, 835, 839, 840, 848, 878--880, 891, 892, 894, 901--903, 916--918, 926, 927, 931, 935, 936, 951, 969, & 976 (1949), and 4: 980, 982--984, 986--988, 994, 996--998, 1023, 1027, 1028, 1030, 1032, 1034, 1039, 1053, 1060, 1062, 1069, 1070, 1082, 1083, 1096--1098, 1100, 1101, 1105, 1110, 1111, 1115, 1122, 1126--1129, 1136, 1140, 1147, 1148, 1154, 1164, & 1294. 1949; H. N. & A. L. Moldenke, *Anal. Inst. Biol. Mex.* 20: 3. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 109, 110, 116--118, 120--125, 128--130, 133--135, 137--140, 143--148, 150, 152, 155, 156, & 174. 1949; Moldenke, *Phytologia* 3: 293 (1950), 4: 79 (1952), and 4: 192--197 & 451. 1953; E. H. Walker, *Smithson. Rep.* 1952: pl. 10. 1953; Reinders-Gouwentak in Van Steenis, *Fl. Males.*, ser. 1, 4 (4): 514. 1953; F. A. Mendonca, *Lejeunia* 16: 133 & 135. 1953; Lindeman, *Veget. Coast. Reg. Surin.* 52. 1953; Moldenke in Humbert, *Fl. Madag.* 174bis: 2--5, fig. 1. 1956; Moldenke, *Phytologia* 6: 171 & 175. 1958; Stearn, *Kew Bull.* 1958: 35. 1958; Cuatrecasas, *Bol. Soc. Bot. Mex.* 23: 87, 91, & 92. 1958; Moldenke, *Résumé* 132--135, 143, 145, 146, 150, 152, 154, 155, 157, 158, 160, 165--167, 171, 173--175, 177, 179, 181, 182, 186, 187, 189, 191--196, 198, 200, 205, 207, 211, 213, 235, 236, 298, 341, 343, 355, 417, & 440. 1959; Moldenke, *Résumé Suppl.* 1: 8 & 10--15. 1959.

Illustrations: Bruce, *Trav. Abyss. & Nub.* 5: app. 44--46 (colored). 1790; Griff., *Trans. Linn. Soc. Lond. Bot.* 20: 6 & 7, pl. 1, fig. 8 & 11. 1846; Griff., *Ann. Sci. Nat. Bot.*, ser. 3, 7: 71 & 12, pl. 1, fig. 8 & 11. 1847; Schnitzlein, *Iconogr.* 2: pl. 137** (colored). 1856; J. Schmidt, *Bot. Tidsskr.* 26: fig. 28--30 & 43 (8). 1904; J. Schmidt in Karst. & Schenck, *Veget.-Bilder* 3: pl. 38. 1906; Sim, *For. Fl. Cape Col.* pl. 120, fig. 3. 1907; Sim, *For. Fl. & Res. Portug. E. Afr.* pl. 83. 1909; Engl. in Engl. & Drude,

Veget. Erde 9 [Pflanzenwelt Afr. 1 (1)]: pl. 45, fig. 202. 1910; Hayata, Acts Bot. Cong. Bruxelles 2: pl. 12--14. 1912; Bews, Journ. Ecol. 2: pl. 22. 1914; Kanehira, Formosan Trees 394. 1917; H. J. Lam, Verbenac. Malay. Arch. pl. 3, D, G, J, & K. 1919; Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: pl. 14--19. 1921; H. Walter, Bericht. Schweitz. Bot. Gesell. 46: 217. 1936; Record & Hess, Timbers New World pl. 14. 1943; E. D. Merr., Pl. Life Pacific World fig. 55. 1945; E. H. Walker, Smithson. Rep. 1952: pl. 10. 1953; Moldenke in Humbert, Fl. Madag. 174bis: fig. 1. 1956.

Low or large, erect, willow-like, much-branched tree or shrub, to 10 m. tall, sending out soft, radiating, horizontal roots about 6 inches below the surface of the ground, with many erect finger-like tapering pneumatophores about 10 cm. tall; trunk to 25.5 cm. in diameter and 60 cm. in circumference, often with many aerial roots along the trunk to a height of 2 m., not reaching the ground; bark smooth, varying from white or grayish-white to olivaceous; wood white or pale, heavy, hard, burly, with a turnip-like odor; branchlets and twigs rather slender, decussate, subterete or quadrangular, densely pulverulent-puberulent with buff, grayish, or whitish furf, or sometimes merely obscurely pulverulent and brown in color or even glabrate (after the thin outer whitish or grayish densely pulverulent-puberulent bark has worn off); nodes swollen, conspicuously annulate, articulate; principal internodes 0.8--7.6 cm. long; leaves decussate-opposite, often described as silvery or (by Volkens) light-green on both surfaces, slightly whitish beneath when fresh; petioles rather stout, 3--14 mm. long, flattened above, mostly longitudinally wrinkled beneath in drying, ampliate at the base, usually densely pulverulent-puberulent or tomentellous with incanous, cinereous, or greenish-yellow furf, rarely only very obscurely so or even glabrate; leaf-blades firmly chartaceous, subcoriaceous, or coriaceous, usually light-green on both surfaces or silvery beneath when fresh, very dark-green and shiny above when dry, mostly brunnescenscent or nigrescent in drying, varying from sordid-gray or white to flavidous beneath, varying from ovate or lanceolate to lanceolate-oblong or elliptic, 3.5--12 cm. long, 1.3--5 cm. wide, usually rather abruptly acute at the apex, more rarely sharply acute, entire and with the margins usually very slightly subrevolute, acute or acuminate at the base and prolonged into the petiole, more or less obscurely pulverulent or glabrous and sometimes more or less resinous- or impressed-punctate above, densely pulverulent-puberulent with cinereous or incanous to flavidous furf beneath; midrib slender, prominulent above and sometimes very obscurely canaliculate at the base, rounded-prominent beneath, extending through to the apex on both surfaces; secondaries very slender, 8--15 per side, irregular, arcuate-ascending, rather indistinctly anastomosing in many irregular loops at the margins; tertiaries about similar to the secondaries in thickness and, like them, prominulent on both surfaces, but usually obscured by the furf beneath; veinlet reticulation rather abundant, subprominulent above, usually hidden by the furf beneath; inflorescence axillary and terminal, the axillary inflorescences mostly soli-

tary in each axil (rarely paired), 1.5--5 cm. long, 7--15 mm. wide, mostly capitate or subcapitate, occasionally short-spicate with about 2 opposite flowers borne a slight distance below the terminal cluster of 3 or 5; terminal inflorescences arranged in paniculate fashion, subfoliose, the cymes few- or many-flowered; peduncles stout or slender, 0.6--4 cm. long, deeply sulcate in drying, similar to the twigs in puberulence, but the furf usually more sordid or flavidous and denser; flowers sessile, odorous, usually without a marked blooming season; the single bractlet and 2 prophylla ovate or broadly ovate, about 2.5 mm. long, concave, obtuse or rounded at the apex, glabrous on the inner surface, densely silvery-tomentose or sericeous along the margins and on the back or glabrescent; calyx small, urceolate, about as long as the corolla, green, its tube very short, the lobes imbricate, rounded-ovate or broadly ovate to elliptic, 2--4 mm. long, rounded at the apex, glabrous on the inner surface, pubescent on the back and ciliate along the margins; corolla white, soon turning yellow or orange to dark-orange or red-orange, rigid, blackening after drying, deciduous, its tube campanulate, 1--2 mm. long, equaling or shorter than the calyx, the lobes 4, usually yellow, varying from ovate or rounded-ovate to oblong, 3--4 mm. long, radiately patent and erecto-patulous, glabrous on the inner (upper) surface, densely and minutely tomentose or sericeous on the outside except at the apex; stamens very shortly exserted, sometimes black; filaments short, erect; anthers black, subrotund, compressed, about as long as the filament; style filiform, narrower than and half as long as the ovary or subobsolete, smooth, yellow; stigma manifest, as long as or shorter than the style, subsessile, filiform, obtuse; fruiting-calyx hardly changed, the bractlet, prophylla, and sepals densely puberulent on the outer surface, closely appressed to the base of the fruit; fruit yellowish-green or pale-green to grayish-green, ovate or conic, 1.2--2.5 cm. long, 7--20 mm. wide, mucronate or rostrate at the apex and mostly somewhat asymmetric (at least when young), densely cinereous- or incanous-pulverulent, distinctly beaked when young, usually not beaked when mature, dehiscent while still on the tree; seed one, large, compressed; cotyledons reniform, light-green, punctate; radicle cylindric, hirsute at the base.

This very variable and widespread species is found in its typical form from Egypt and Arabia, along both shores of the Red Sea and the western Indian Ocean to the Cape of Good Hope, eastward along the shores of the Arabian Sea, the Bay of Bengal, the northern and eastern Indian Ocean, the South China Sea north to Hong-kong and Formosa, and the islands of the Philippine Sea, Coral Sea, and South Pacific to New Zealand. It inhabits tidal mud-flats, low ground flooded by salt-water, seashores, swamps, rocky beaches, and salt-water. It is said to be common in mangrove swamps in Thailand and very common in Tanganyika at the edge of the sea, on sand in seawater, in estuaries, and the maritime zone in general. Kirk states that it is "confined to the region bounding the coast and up the rivers about three miles". Cooper says that it is found "in the muddy seashore"; Slade reports "growing

in the salt water"; Fisher found it "in swamp near the seacoast"; and Aylmer found it "in the sea". Mrs. Taylor describes it as a "spreading bush in mangrove swamps". Usually it grows at sea-level, but Miss Franks reports it in Natal from an altitude of 101 feet! It has been collected in anthesis in every month of the year except January, and in fruit in January, February, April, and July to October. In Lourenço Marques it is said to bloom from August to October. In Selangor it grows in association with Scyphiphora hydrophyllacea Gaertn. f. The wood is used for fire-wood and for making poles in Lourenço Marques, and the plant is said to have medicinal uses. Bruce, in his Trav. Abyss. & Nub. 5: app. 45 (1790) says "The Arabians, it is said, make boats of this tree. Its wood is so hardened by the sea, and also so bitter in taste, that no worm whatever will touch it. Of this tree the Arabians also make tooth-picks, these they sell in small bundles at Mecca, and are reported to be favourable to the teeth, gums, and breath." He reports the species on Toulahout Island, Eritrea -- I am assuming that this is the "Toalut" of Ehrenberg. Gómez de la Maza reports that the Arabs use the mucilaginous root as an aphrodisiac.

Among the vernacular names recorded for the species in its typical form are "afiafy", "apiapi", "api-api", "api-ápi", "api-api merah", "apiapi puteh", "api-api puteh", "api-api putik", "apiapy", "avicenne résineux", "bina", "biná", "boak", "buffálan", "buffálon", "bungalon", "buffálu", "buffálu", "cheriá", "chobougi", "cuancua", "cuancuan", "dudli baen", "fika-fika", "harav", "honko", "imbeda", "imvetu", "kalapíni", "kalapíni mangitit", "kalapíni-maputi", "kapoe neri", "kausia", "kiapiapi", "koak", "kolo-kolo", "kulási", "kuyápi", "lame apyu", "lame-apyu", "lechobazi", "lifigig", "lifigog", "mabaran", "mada-chettu", "mangrove blanc", "mavete", "m'candella", "mchu", "miapi", "miápi", "moosa", "mtschu", "nalla-mada", "oepata", "piápi", "piksik", "pipisig", "pipisik", "rack", "rack-tree", "red api-api", "renggou", "sagarai", "salgiero", "samair kao", "showarab", "shūra", "smae khao", "timmer", "tices léwo", "tivar", "tobose", "tobucho", "upputti", "white api-api", "white mangrove", "white willow mangrove", and "witte mengerhout". It is worth noting that the name "oepata" is also, and perhaps more correctly, applied to A. officinalis L., while "white api-api" is applied also to A. lanata Ridl. and A. officinalis.

The type of A. marina was collected by Pehr Forskål at the edge of the Red Sea in Yemen, Arabia, and is deposited in the herbarium of the British Museum in London. Its leaf-blades are abundantly resinous-punctate above. Hildebrandt 3234, from Madagascar, has them slightly punctate. The type of Halodendrum is Herb. Petit-Thouars s.n. in the herbarium of the Muséum National d'Histoire Naturelle at Paris. The type of A. officinalis var. ovatifolia f. flaviflora is Kuntze s.n., collected in Zanzibar in April, 1894, and is deposited in the herbarium of the Botanisches Museum at Berlin, and of f. tomentosa is Kuntze s.n., collected in Zanzibar on April 9, 1894, and deposited in the United States

National Herbarium at Washington. The type of Trichorhiza lechenaultii is Preiss 1298, collected near Fort Leschenault, Western Australia, and is deposited in the herbarium of the Botanisk Museum at the University of Lund. The type of A. mindanaense is Elmer 11990, collected in Mindanao, Philippine Islands. Dr. Lam places Elmer's binomial in synonymy under A. officinalis L., while Bakhuizen van den Brink places it in the synonymy of A. marina var. resinifera (Forst.) Bakh.

Hayata's paper in Acts Bot. Cong. Bruxelles 2: 68, pl. 12-14, listed above, is cited by Stapf as "1910", but was actually not published until 1912. The paper by Bewas in Journ. Ecol. 2: pl. 22 (1914) is sometimes cited to "Hill & Hanley", apparently in error.

The fact that the fruit is distinctly beaked when young, and mostly not beaked when mature, may be seen well on the Krauss 241 specimen at Kew. The small-leaved form of the species is well exemplified by How 70896. The Swinhoe s.n. from Takow, Formosa, and most of the Hongkong specimens have, in general, shorter, blunter, and more elliptic leaf-blades than most of the remainder of the material cited, as do also Price 611 from Formosa, Loher 5040 from Luzon, and Kerr 2095 from Thailand. The Kerr and Loher specimens have more spherical fruit and therefore represent Stapf's A. sphaerocarpa. The other collections mentioned represent what some authorities are pleased to separate as var. intermedia. The characters distinguishing these taxa, however, are not constant, and it does not seem practical to maintain them. Ford s.n. [July, 1879], Playfair 160, Swinhoe s.n. [Takow], Price 611, Kerr 2095, Curtis 3533, and Loher 5040 were all annotated by Dr. Stapf as A. sphaerocarpa. The Curtis collection, from Malaya, has large leaves (the blades to 8.5 cm. long and 4.2 cm. wide), whereas the Kerr and Loher collections exhibit small leaves (the blades only 3--5.5 cm. long and 2.1--3.5 cm. wide). The fruit on Madras Herb. 13712, from Madras, India, is just as "spherical" as that seen on the sheets annotated by Stapf.

It is worthy of note that Baker in Thiselton-Dyer, Fl. Trop. Afr. 5: 331 (1900) distinguishes the east and west African species as follows:

Corolla-lobes white, pubescent within.....A. africana.

Corolla-lobes bright-yellow, glabrous within.....A. marina
[which he calls "A. officinalis"].

The "A. tomentosa L." included in the synonymy of A. marina by me is based on a Natal plant called "witte mengerhout". The "A. officinalis L." of Biswas, Notes Roy. Bot. Gard. Edinb. 18: 163 (1934) is actually A. marina, while his "A. tomentosa Jacq." is actually A. officinalis! This is typical of the confusion which has surrounded the nomenclature of this species in botanical literature to date.

Roig in Plant. Med. Cuba 449 (1945) confuses this Old World

plant with the Cuban A. germinans ("A. nitida Jacq.") and says "Según Gómez de la Maza, la resina....la usan como alimento los neo-hollandeses y las hojas verdes, cocidas con las hojas verdes de la Ipomoea campanulata Lin. sirven para hacer cataplasmas emolientes. Agrega que los árabes usan la raíz mucilagínosa y salada de esta planta como afrodisíaco, propiedad que debe a su acción corroborante y dinamógena."

Guatrecasas in Bol. Soc. Bot. Mex. 23: 91 (1958) refers to an ecologic association which he calls "Avicennietum marinae". Walter & Steiner, in the reference given above, found the osmotic pressure in this species to range from 35 to 46 atmospheres. Ridley, in his Dispersal of Plants, page 310 (1930), suggests that A. intermedia is a hybrid between A. officinalis and A. alba. Personally -- as I have pointed out in Am. Midl. Nat. 59: 333-334 (1958) -- I feel that hybrids must occur very often where several species or varieties of this genus grow together. Such hybridity may account for some, at least, of the puzzling intergrading specimens.

Record & Hess, in their Timbers of the New World, pages 72-73 and 593, plate 14 (1943), adopt the name A. marina for the common New World species and reduce Jacquin's A. nitida to synonymy under it. This is an utterly inexplicable opinion, which, unfortunately, has been followed by several other contemporaneous authors without investigation. Pearson, Fl. Cap. 5 (1): 225 (1910) uses A. officinalis as the name for the species here under discussion and reduces to synonymy under it the names A. tomentosa Jacq., A. africana P. Beauv., and A. meyeri Miq. The first and third of these, of course, are actually A. germinans, while the second is regarded by me as a separate species. He affirms that the plant is found growing in association with Rhizophora mucronata Lam. and Bruguiera gymnorhiza Lam. and "also on the tropical shores of both hemispheres". He cites a Peddie s.n. not as yet seen by me. Baker, in Thiselton-Dyer, Fl. Trop. Afr. 5: 332 (1900) cites Quarton-Dillon s.n. from Eritrea and Terracciano s.n. from the "Bay of Anfilah, Somaliland", not as yet seen by me.

Germinating seeds and young seedlings are seen on the Bent s. n. specimen in the Kew herbarium, while Yates 948 and 949 in the University of California herbarium show fungus-infested leaves; Drège 4102 at Berlin includes a specimen of bark. Merrill 2488 in the herbarium of the Missouri Botanical Garden exhibits many of the characters of var. rumphiana and may indicate that this collection represents a hybrid plant. The Teijsmann 1753 H.B. collection is a mixture with material of A. officinalis. Peter 31048 is a mixture with something not avicenniaceous.

The Poiteau s.n. in the DeCandolle Herbarium is inscribed "St. Dom.", but surely in error. The Junod 500 specimen at Kew bears a notation indicating that it is from Natal, but all other sheets of this number are marked as being from Mozambique, and I

am citing it herein from the latter country. The G. Gardner 236 specimen in the Paris herbarium bears a printed label reading "Brésil" and was on this account previously misidentified as A. schaueriana -- I believe now that this plant was probably collected in Ceylon and is A. marina.

Previous records of this typical form of A. marina from New Zealand given by me are erroneous, being based on a United States Exploring Expedition [Wilkes] specimen in the Torrey Herbarium which proves actually to be var. resinifera.

Numerous herbarium specimens of this species, in various herbaria, have been misidentified as A. officinalis L., A. alba Blume, A. africana P. Beauv., A. nitida Jacq., A. officinalis var. alba (Blume) C. B. Clarke, Bruguiera gymnorhiza Lam., "Piptotaenia dregei", and even Carallia sp. Merrill 2488 has been misidentified as A. marina var. rumphiana (H. Hallier) Bakh., while Copeland 558, Elmer 11990, and Merrill 1179, 2413, and 2585 has all been misidentified in the past as A. marina var. resinifera (Forst.) Bakh. Schweinfurth annotated his no. 965 as "A. officinalis var. folii variegati".

Other mangroves of the east African coast are Bruguiera gymnorhiza Lam. (Rhizophoraceae), Ceriops candolleana Arn. (Rhizophoraceae), Lumnitzera racemosa Willd. (Combretaceae), Rhizophora mucronata Lam. (Rhizophoraceae), Sonneratia alba J. Sm. (Sonneratiaceae), and Xylocarpus obovatus A. Juss. (Meliaceae). On all of these species of Loranthus are parasitic.

The collector, Johann Georg Teede, has his surname misspelled "Taede" in the British Museum herbarium and "Tiede" in the Berlin herbarium, while Nicolaas Laurens Burman often has his surname misspelled "Burmann".

The "Avicennia officinalis L." pictured by J. Schmidt in Karst. & Schenck, Veget.-Bilder 3: pl. 38 (1906) from Koh Chang Island, Thailand, is probably A. marina, as is the herbarium specimen gathered by this collector, cited below.

In all, 1096 herbarium specimens, including the types of all the names involved, and 60 mounted photographs and drawings have been examined.

Citations: EGYPT: B. K. Cooke 147 (K); Drar 42 (S), 95/1140 (N), 126 (S); C. G. Ehrenberg s.n. [Promont. Ras Muhammed] (B, K, X), s.n. [R. de Mahommed, Sinai] (P), s.n. [Penins. Sinai] (B, N--photo, Z--photo); Frauenfeld s.n. [Sinai] (V); A. Kaiser 909 (S, X), 948 (X), 980 (X, X); Schweinfurth 61 (X), 965 (B, B, Bm, K, N--photo, V, X, Z--photo), 966 (B, Bm, K, N--photo, V, X, Z--photo); G. V. Tackholm s.n. [21/1/1929] (S, S), s.n. [23/1/1929] (S); Wilkinson s.n. [1834] (Bm). SUDAN: Nubia: Bent s.n. [1896] (K). Red Sea: Acerbi s.n. [Red Sea, 1831] (Dc); Bové 299 (Le), s.n. [Red Sea] (V); C. G. Ehrenberg s.n. [Red Sea] (Le); Herb. Courbon 19 (P); Kahvin s.n. [Red Sea] (V). ERITREA: C. G. Ehrenberg s.n. [Massaua]

(B, B); Pappi 197 (B, Bm, Cb, K, V); Schweinfurth & Riva 44 (X), 61 (K, X); Steudner 1307 [207] (B, K, N--photo, Z--photo); Tellini s.n. [27.XII.1902] (N). SCHECH SAID ISLAND: Beccari s.n. [Schech-Said] (B); C. G. Ehrenberg s.n. [Scheik Said Isl.] (K, X); J. M. Hildebrandt 731 (B, Bm, Le V); Pappi 3168 (Bm). TOULAHOUT ISLAND: C. G. Ehrenberg s.n. [Toalut Isl.] (S). MARDUNA ISLAND: C. G. Ehrenberg s.n. [Marsanam] (Cp, Cp, Le, P). ADJUNA ISLAND: Salt s.n. (Bm). ABU MENQAR ISLAND: Adham s.n. [Feb. 1939] (Z--photo); Nasr s.n. [Feb. 1939] (Z--photo). ABYSSINIA: H. M. Arnaud s.n. (P); Jalt s.n. (Cb); Petit s.n. [Chire] (B, B); Quartin-Dillon & Petit s.n. [1844] (P), s.n. (V). BRITISH SOMALILAND: Drake-Brockman 437 (B), 444 (K), 746 (B); Playfair s.n. [Aloola, near Bunder Murayah] (K). SAAD-ED-DIN ISLAND: E. M. Godman 151 (Bm). HARNISH ISLAND: Slade 2 (K). FRENCH SOMALILAND: Debeaux 255 (P, P). TANGANYIKA: Braun 1181 (B, B, B); Burrows s.n. [Oct. 10, 1934] (A, N, N, N, Y); Burt 199 (Bm, K), 4468 (K); Busse 405 (B, Bm, Cb, Cb, K, Le, V); Collector undesignated 4074 (B); Engler 2227 (B, B, N--photo, Z--photo); H. G. Faulkner 546 (S), 1574 (S), 1591 (S); J. M. Hildebrandt 1241 (B, B, K, V, V); Holst 3059 (B, K, Mu--1728, V); Kässner 25 (B, Bm, K); Koerner 2262 (B); Kuhlmann 7490 (Us); Migeod 391 (Bm); A. Peter 14586 [O.III.222] (B), 14846 [O.III.231] (B), 15101 [O.III.241] (B), 22820 [O.IV.274] (B), 22864 [O.IV.276] (B), 23734 [O.IV.311] (B), 23735 [O.IV.311] (B), 39617 [V.208] (B), 44794 [V.344] (B), 45115a [V.353] (B), 51794 [O.IV.249] (B); Schlieben 2547 (B, Bm, Br, Cb), 5787 (B, B, Bm, Br, N--photo, S, Z--photo); Stuhlmann 7490 (B), 1.6 (B), s.n. (B); Verdcourt & Greenway 132 (S); Volkens 160 (B, B, Br, K, N--photo, Vu, X, Z--photo), 1241 (Bm); G. B. Wallace 728 (K); Wigg 474 (Af, Af, Af). ZANZIBAR: Boivan s.n. [9bre 1848] (B), s.n. [1847--1852] (P, P, P); Engler 318 (B, N--photo, Z--photo); P. J. Greenway 1338 (K); Kuntze s.n. [Zanzibar, 9/4/94] (N, N--photo, W--694897, Z--photo), s.n. [Zanzibar, IV.94] (B, N--photo, Z--photo), s.n. [1/10/94] (X), s.n. (K); Stuhlmann 1.760 (B); Mrs. Taylor 375 (K). KENYA: Bathscombe 617 (B); R. M. Graham 251 [367] (B, Bm, Br, K, W--1429953); J. W. Gregory s.n. [Jakonunbi, 1893] (Bm); Linck s.n. [Osi] (B, B); Mearns 2145 (Bm, Bm, Br, Cp, N, P, W--632111), 2154 (Bm, F--468339, K, N, W--632120); A. Peter 17578 [O.IV.94] (B); Teede 35 (B, Bm, N--photo, Ol, Ol, Z--photo); Wakefield s.n. [Mombasa, Nov. 1884] (K); C. W. Webber 617 (K). LAMU ISLAND: Mrs. Thomas 216 (B, Bm, K, N--photo, Z--photo). PORTUGUESE EAST AFRICA: Gazaland: Swynnerton 1901 (Bm, K). Inhambane: W. C. H. Peters s.n. (B, K); Sahelpe 4427 (Bm). Lourenço Marques: J. Borle 3 (Af--22684, Br, Us, V, V), 114 (Af--22678); Coomans s.n. [XI.07] (Lu); H. M. L. Forbes 90 [36] (P); E. E. Galpin 7887 (Af--22679); F. Gomes e Sousa

3793 (S); Pole-Evans H.16929 (Af--22687); F. R. R. Schlechter 11581 (Af--22681, B, B, Bg, Bm, Br, Cb, Ct, Ed, K, Le, P, S, V, W--553276, X). Mozambique: Coomans s.n. [XI.07] (Lu); W. H. Johnson 18 (K, P); Junod 500 (B, Br, Cb, K, X); J. Kirk 11 (K), 45 (K), s.n. [mouth of Zambesi, Jan. 1861] (K), s.n. (K--drawing, K--drawing); A. Peter 31048 (B), 51245 [S.73] (B, B); Shantz 365 (K); Stocks 2 (K). UNION OF SOUTH AFRICA: Cape of Good Hope: H. W. Buek s.n. (Le); Drège s.n. [Cap] (Cb, Lu, P, P); O. H. Miller s.n. [Pegler 2130] (Af--22686, Af, Ct); Mogg s.n. [Jan. 1933] (S); Sim s.n. [Elliotdale, May 1901] (Af--22680); Soga 1941 [MacOwan 1899 & 3203] (B, B, K, Us), s.n. [MacOwan 1941] (Bm, Cb, Ct, P); Wager s.n. [Jan. 1929] (Af, N). Natal: T. Cooper 1233 [Herb. Bolus 1253] (Ct, K); Drège 4102 (B), s.n. [Port Natal, 1838] (Dc), s.n. [1838] (Ol, V), s.n. [1844] (M), s.n. [Port Natal] (Cb), s.n. (B, Bm, K, K, S, V, V, X); G. F. S. Elliot 1712 (Ed); H. M. L. Forbes s.n. [Isipingo] (Cp); Forbes & Obermeyer 15 (Na--26899); Franks s.n. [Isipingo] (Na--12498); Fries & Fries 3020 (S); Gueinzus 195 (V), 458 (V, X), 539 (V), s.n. [Port Natal] (S, S), s.n. (Af); Haptröm & Lindberg s.n. [23 Aug. 1936] (S, S); W. H. Harvey s.n. [1840] (K); Hutchinson, Forbes, & McClean 7 (Na--20884); C. F. F. von Krauss 241 (Af--13967, Bm, Cb, K), s.n. [Juni '39] (Mu, V), s.n. (X); G. Lindeberg s.n. [23 August 1936] (S); Lüttjeharms 5284 (S); Meebold 12828 (Mu); Plant 21 (Bm, Cb, Cl, K, N, P, S, S, V, X); Rehmann 9004 (B, Bm); Rudatis 1259 (B, Bm, Ed, K); Sanderson 886 (Ct, Na--1175), s.n. (K); Setchell & Setchell s.n. [Apr. 27, 1927] (Ca--312649); Thode A.1521 (Af, Na--24918); Van der Byl s.n. [Marloth 9397] (Af--22682, Na--16080); Wahlberg s.n. [Goda] (S, Us), s.n. [Port Natal] (S); Wilms 2229 (Bm, K); J. M. Wood 395 (Bm), 1360 (Ct, K, Na--11012), 12973 (I, Vi). SALISBURY ISLAND: H. M. L. Forbes 64 (Na--17242), 325 (Na--18367); Moonsammy s.n. (Na--17112). EUROPA ISLAND: Voeltzkow 285 (B). COMORO ISLANDS: Aldabra: W. L. Abbott s.n. [Oct.--Dec. 1892] (W--287131), s.n. [Aldabra Isl.] (B, P); Gardiner 22 (K). Grand Comoro: Humboldt 182 (P), 1003 (B, Bm, K, N--photo, P, Z--photo). Mayotte: Boivin 3226 (P). Mohelli: J. Kirk s.n. [April 1861] (K). SEYCHELLES ISLANDS: Astove: D. V. Fitzgerald 5960 (B). Mahé: Boivin s.n. [Mahé] (P); Gardiner X.4 (K), s.n. (K); Pervillé 121 (B, Le, P, P). Praslin: J. Horne 302 (K). NOSY-BÉ: Boivin 2083 (P); Pervillé 324 (P, P), 325 (P). MADAGASCAR: K. Afzelius s.n. [Majunga, 12.4.1912] (K, S), s.n. [16.5.1912] (S, S), s.n. [16.6.1912] (Us); Aubert s.n. [Herb. Jussieu 5084] (P); Baron 5871 (P), 5872 (Bm), 6727 (B), s.n. (K); Boivin 2486 (P); Bojer 160 (P), II.87 (V), s.n. [1839] (Dc), s.n. [Bé-tsi-Bouka] (K); Collector undesignated 328 (B); D'Alleizette 1423m (P); Decary 2178 (P); Grévé 328 (B, K, K, P), s.n. [Madagascar] (Ca--616081); Herb. Alstroemer s.n. (S); J. M. Hildebrandt

3234 (B, B, Bm, Cb, Cb, K, Mu--1664, P, X, X); Humbert 3952 (B); Martin 20 (Cb, Cb); Oldenburg s.n. (Th); J. M. H. A. Perrier de la Bâthie 1197 (P); Pervillé 324 (K, Le), 325 (K), 326 (B, Le), 329 (B, E--photo, N--photo, Z--photo); Thunberg s.n. (S, S); Viguiier & Humbert 56 (B, P). ARABIA: Hejaz: Botta s.n. [1837] (P, P); Zohrab 310 (K, X). Schoro: Herb. Courbon s.n. [Chora] (P, P); Schimper 736 [Herb. Prager 18690] (B, B, B, Bm, Cb, Cb, Cl, Dc, Dr, Du, Ed, Gg--31939, K, Le, Le, Mu--1076, P, V, V, V, V, V, Vu, X, X, X); Shabetai F.1819 (K). Yemen: Bové 229 (B, Br, Cb, Dc, K, P), s.n. [1834] (Us), s.n. [Arab. fel.] (P); Collector undesignated s.n. (Cl); Deflers 30 (P); Forskål s.n. (Bm--type). Province undetermined: C. G. Ehrenberg s.n. [Toavent] (B); Hennecart s.n. [1838] (P); Paulay s.n. [26.XI.98] (Vu); Philby 38 [Wadi Humair] (Bm); Schimper s.n. [Arabia] (V); Simony s.n. [26.XI.98] (Vu, Vu, Vu, Vu, Vu, Vu, Vu). GENOBI ISLAND: C. G. Ehrenberg s.n. [Genobi; Herb. Mus. Nac. Hist. Nat. Chile 16023] (B, B, Cp, K, Le, Sg, X); Ehrenberg & Hemprich s.n. [Genobiat Isl.] (B, P). KAMARAN ISLAND: Faurot 7 (P, P). GORALES ISLAND: Botta s.n. [Ile Goraes] (P). DISSEE ISLAND: Herb. Courbon s.n. [Ile Dissée] (P, P, P). SOCOTRA ISLAND: I. B. Balfour 559 (K). BAHRAIN ISLANDS: R. Good 247 (Bm). INDIA: Madras: Beddome 6536 (Bm), 6537 (Bm); Bourne & Bourne 2334 (K, K), 3015 (K); Cleghorn s.n. [Sept.1856] (Ed); Cornwell 1 (Dd, Dd), 3 (Dd, Dd); Dalm s.n. [Trincomalie, Aug. 13, 1860] (Ed); C. E. C. Fischer 4114 (Cl, Cl), 4769 (Cl, Cl), s.n. [Tummalapenta, 13/9/1922] (K, K); Foulkes 108 (Cl); Gamble 12191 (Cl, Dd), 12668 (Dd, K), 12824 (Cl, Dd), 13502 (K), 17673 (Bm, Cl, Cl, K), 18173 (Bm), 20778 (Cl, Dd); Herb. Hooker s.n. [Madras] (K); Herb. Madras 1747 (Cl), 13712 (K, N, N--photo, Z--photo); Heyne s.n. [Samulcotta, 1811] (K); Homfray s.n. [Sept. 1885] (K, K); König s.n. [Coromandel] (Bm); Ramachandran s.n. (Gg--213786); Ramaswami 512 (Cl); R. Wight 2329 (Cl, K, Le, Le, Le), 2599, in part (Ed), 2600 (Ed), s.n. [Penins. Ind. or.] (Cl, Ed, Ed, Ed, K, N, P). Orissa: Mooney 3394 (N). West Bengal: Biswas 744 (Cl), s.n. [Chakaria] (Cl, Cl); C. B. Clarke 21662 (Cl); Collector undesignated 218 (Bz--16971); Gamble 10115 (K); Janardan s.n. [Matla, June 14, 1899] (Cb); Kurz s.n. [Mutlah] (Cl, Cl, Cl), s.n. (Mu--1166); Nath 335 (Dd), 4134 (Dd, Dd, Dd), 4134a (Dd). State undetermined: Herb. Bernhardi s.n. [Ind. orient.] (E--118592); Herb. Trattinick s.n. [Ind. orientali] (V); Herb. Vahl s.n. [Ind. orient.] (Cp); Herb. Wight 1742 (Cl); Hohenacker 68, in part (Le); Wallich 1742, in part (B, Cl), 1742d (B, B), 1742e (B, B); R. Wight 1313 (Ed). FRENCH INDIA: Contest-Lacour s.n. [1868] (Lu). DIAMOND ISLAND: Prain s.n. [30 Nov. 1889] (Cl, Cl). GREAT COCOS ISLAND: Prain s.n. [1890] (Cl), s.n. [April 1891] (Cl). BURMA: Tenasserim: H. Falconer 388 (Le), 2416 (Bz--

16970); Khant 11365 (Dd). ANDAMAN ISLANDS: South Andaman: King's Collector s.n. [Apr. 1891] (W--261899); Kurz s.n. [South Andaman] (K, Mu--1165, P). Island undetermined: G. King s.n. [2-5-91] (Dd); King's Collector 300 (Cl), s.n. [19-5-1893] (Cl, Ut); Kurz s.n. [Perseverance Bay] (Cl), s.n. [1867] (Cb), s.n. (Cl, Cl); Lace 2834 (Cl, Dd, K); Prain s.n. [Apr. 1891] (Dd); Prain's Collector 4 (Cb), 74 (B, Cb, Mu--3923, X). CEYLON: Claghorn s.n. [Northern Division] (Cl); G. Gardner 236 (P); Herb. Forest Research Instit. Dehra Dun 35684 (Dd), 35685 (Dd); Herb. Hort. Bot. Perad. s.n. [Aug. 1883] (B); Herb. Lenormand s.n. (S); Herb. Peradeniya 488 (A, G, N, N, N, N, W, Y); Holtermann 13 (B), 21 (B), s.n. [5/2/90] (B), s.n. [Feb. 1890] (B); N. D. Simpson 8189 (Bm), 9850 (Bm), 9944 (Bm); Thunberg s.n. [Ceilonia et Java] (Th); Thwaites 1961, in part (B, Bm, Cb, Cb, Cl, K, K, P, V, X), s.n. (Vu); G. W. Walker 45 (Ed); Mrs. Walker s.n. (B); Worthington 529 (Bm), 1014 (Bm). CHINA: Kwangtung: How & How 469 [Herb. Lingnan Univ. 19649] (N). Province undetermined: A. Henry s.n. [June 16] (N), s.n. [Dec. 5] (N); Meyen 11724 (B, N--photo, Z--photo), 11725 (B, N--photo, Z--photo). KULUNGSU ISLAND: Sampson s.n. [Kulungsu Isl., opp. Amoy] (Bm). FORMOSA: A. Henry s.n. [Takow] (B, N, W--455095, W--455863); Herb. Univ. Imp. Tokyo wood spec. 5799 (N); Playfair 160 (K, N--photo, Z--photo); W. R. Price 611 (K, N--photo, Z--photo); Simada 210 (Ca--344900); Swinhoe s.n. [Takow] (K, N--photo, Z--photo); T. Tanaka 5467 (Bm, Cp, P). HONGKONG: C. Ford s.n. [July 1879] (K, N--photo, Z--photo); Sampson s.n. [Herb. Hance 11735] (Bm). HAINAN ISLAND: F. C. How 70896 (B, F--780167, N); Lei 1222 (I); C. Wang 33830 (N). INDOCHINA: Annam: Poilane 12345 (P). Cochinchina: Collector undesignated 75 (P); Kuntze 3923 (N, N); Pierre s.n. [1874] (B), s.n. [1876] (P), s.n. (P); Thorel 289 (P), s.n. (P). Tonkin: Balansa 941 (P); Bon 5548 (P, P, P), 5641 (P, P); Pételot 4546 (N), s.n. [24 juin 1932] (P), s.n. [Juillet 1932] (W--1577681), s.n. [Août 1932] (N, N, P, W--1577680). State undetermined: Chevalier 61 (P, P). PHUQUOC ISLAND: Pierre s.n. [Apr. 1874; Herb. Hance 11735] (Bm). THAILAND: Herb. Roy. Forest Dept. Siam 1 (N); A. F. G. Kerr 2095 (K, N--photo, Z--photo); Lakshnakara s.n. [Paknam, July 14, 1934] (F--752075, N); Marcen 855 (Bm); Pierre 4 (B, P, P, P, P, P); J. J. H. Schmidt 38 (Cp); Smitinand 1463 (Z). MALAYA: Malacca: W. Griffith 6070 (K), s.n. [Malacca, 1845] (Bm, Br), s.n. [Malacca] (K). Penang: C. Curtis 3533 (K, K, Mi--photo, N--photo, N--photo, Z--photo, Z--photo); Haniff 277 (Ca--355086, Cp, La); Herb. Forest Dept. F. M. S. 16714 [timber spec. 2438] (N), 16715 [timber spec. 2439] (N). Perak: Scortechini 963 (Ca--528991, Cl, Cl, K, K, K); Seimund s.n. [Pulau Lalang, Nov. 22nd 1925] (Bz--16964, Ca--360531). Selangor: Burkill & Shah 979 (Ng--20207); Ridley s.n. (Bz--16969). Singapore: M. R. Henderson 18642 (Bz--16965).

Wellesley: J. G. Watson 10504 (Ed). LIUKIU ISLANDS: Iriomoto: Walker & Tawada 6566 (Le, N). PHILIPPINE ISLANDS: Cebu: M. Ramos s.n. [Herb. Philip. Bur. Sci. 11128] (Cm, F—425269). Cuyo: Kienholz s.n. [Herb. Philip. Bur. Sci. 15543] (Ca—262763). Leyte: Wenzel 1449 (Bm, Cb, Cb, Cl, E—800462, E—800463, F—441094). Luzon: Ahern's Collector 140 (W—1584130), s.n. [Merrill, Dec. Phil. For. Fl. 140] (It, Os); R. J. Alvarez s.n. [Herb. Philip. Forest Bur. 22653] (Gg—31942); J. J. Bennett s.n. [Luçonina] (B); J. Clemens s.n. [Manila, April 1925] (Ca—268457); Curran s.n. [Herb. Philip. Forest Bur. 10324] (Br, E—118603); Franco s.n. [Herb. Philip. Forest Bur. 22848] (E—836067); H. Hallier 3520 (Le); Herb. Com. Fl. Forest Filip. 496 (Le); Kienholz 161 [Herb. Philip. Bur. Sci. 15243] (Ca—263021); Klemme s.n. [Herb. Philip. Forest Bur. 4278] (Bz—17072); Loher 4450, in part (Cl, K, Mu—3922, N, W—446888, Z—photo), 5040 (K, N—photo, Z—photo), 14861 (Ca—243083); E. D. Merrill 2488 (B, Cl, E—118601, K, N, W—437445), 2585 (B, Bm, K, N, W—437549); Perrottet s.n. [Manila, 1823] (Dc); Whitford 579 (F—401859, P). MINDANAO: E. B. Copeland 558 (Cb, K, N, W—850463); Elmer 11990, in part (Bm, Br, Bz—17073, E—118605, F—291316, N, N—photo, S—photo, Z—photo); W. I. Hutchinson s.n. [Herb. Philip. Forest Bur. 3947] (Bz—16930); A. de Mesa s.n. [Herb. Philip. Forest Bur. 27612] (Ca—238660, W—1262552); Piper 174 (Le). MINDORO: M. T. Cruz 7 (Ur); Kienholz 127 (Ur), 398 [Herb. Philip. Bur. Sci. 15434] (E—1018117, Ur); E. D. Merrill 1179 (B, K, N, W—436152). PANAY: Curran s.n. [Herb. Philip. Forest Bur. 17337] (Bz—17074, Cl, Le); E. D. Merrill 2413 (B, K, N, W—437371); Ramos & Edaño s.n. [Herb. Philip. Bur. Sci. 31485] (Ca—213894, W—1262832). RIOUW ARCHIPELAGO: BINTAN: Binnemijer 6504 (Bz—16963). RIOUW: Herb. Hort. Bot. Bogor. 9 (Bz—17054). LINGGA ARCHIPELAGO: Singkep: Haroem 16 [Boschproefst. BB.5378] (Bz—16960). SUMATRA: Bruinier 175 [Soeratman 3] (Bz—16945); Gusdorf 8 (Bz—16947); Jochems 5036 (Bz—17048); Lörzing 3831 (Bz—17049), 7285 (Bz—16946); Lwaan 14 [Boschproefst. BB. 14464] (Bz—16948); Yates 947 (Ca—234092, Ca—244189, V), 948 (Ca—234093), 949 (Ca—234094). MADURA ISLAND: Binnendijk 4 (Bz—16837); Collector undesignated 19553 (Bz—17036); DeVriese s.n. [Maduram] (Le, Le); Teijsmann 1753 H.B., in part (Bz—17037). BAWEAN ISLAND: Buwalda 3069 (Bz—73010). KRAKATOA: Leeuwen-Reijnvaan 12563 (Bz—16959). JAVA: N. J. Andersson s.n. [Batavia, Feb. 1853] (S, S); Backer 4698 (Bz—16991), 7746 (Bz—16906, Bz—16907), 16335 (Bz—16988, Bz—16989), 16711 (Bz—16990), 21441 (Bz—16992, Bz—25457), 31491 (Bz—16891, Bz—16892), 32875 (Bz—16894, Bz—16895, Bz—16896, Bz—16897, Bz—16898, Bz—16899), s.n. [18 Jan. 1903] (Bz—16999), s.n. [Aug. 1903] (Bz—16998), s.n. [Dec. 1903] (Mu—4325), s.n. [Aug. 1904] (Bz—16995, Bz—16996,

Bz--16997), s.n. [Oct. 1904] (B, Bz--16993, Bz--16994); Bakhuizen van den Brink 448 (B, Bz--17000, Bz--17001, Bz--17668, Ca--265979, Le, P, Ut), 449 (B, B, Bz--17015, Bz--17016, Bz--17017, Bz--17019, Bz--25456, Cl, Le, Le, P, P, Ut, Ut, V, X), 645 (Bz--17004), 946 (Bz--25458), 1171 (Bz--17010, Bz--17011, Bz--17012, Bz--25455, Le, Ut), 1189 (Bz--17013, Bz--17014, Bz--25695), 1421 (Bz--16900, Bz--16901), 1423 (Bz--16981, Le, Ut--24874a), 1721 (Bz--16884, Bz--16885), 1722 (Bz--16886, Bz--16887), 2127 (Bz--17002), 2128 (Bz--17003), 6747 (Bz--16879), 6753 (Bz--16976), 6767 (Bz--16878), s.n. [Batavia] (V); Banks & Solander s.n. [1770--71] (Bm); Becking 44 (Bz--17020); Beumée A.127 (Bz--16982, Bz--25450); Blume 1152 (Le, Le), s.n. (Cl, N, N, Vu); Boedijn 2669 (Bz--25459); Boschma 91 (Bz--16979, Bz--16980); Bremekamp s.n. (Bz--16987); Bunnemeijer 1528 (Bz--25460, K, P); Clason-Laarman 105 (Bz--16975); Collector indig. s.n. [12-6-'09] (Bz--16877); Collector undesignated 6 (Bz--16977), s.n. [Java] (Le); Commerson s.n. (Cb, P, P); J. Cook s.n. (Cl, Cl, Cl); DeVriese 31a (Le); Direct. Have Senarang s.n. [IX. 1934] (Bz--17005); Djaka 1 [Boschproefst. Ja.2197] (Bz--16883), 2 [Boschproefst. Ja.2198] (Bz--17018, Le), 3 [Boschproefst. Ja.2199] (Bz--16882); H. Hallier s.n. [12.XI.1894] (Bz--16873, Bz--16874, Bz--16875, Bz--16876); Hasskarl s.n. (Le); Herb. Bogor. 16984 (Bz); Herb. Burman s.n. [Java] (Cb, Cb, Cb, Cb, Cb); Hoogerwerf 12 (Bz--17233), 22 (Bz--16835), s.n. [Maart 1935] (Bz--17236); Jelinek s.n. [Exped. Novara] (V); Junghuhn 51 (Le); Karsten 3 (Le); Kollman s.n. [1838] (M); Koorders 9694b (Bz--16909, Bz--16910), 9695b (Bz--16911), 9696b (Bz--16912), 9701b (Bz--17027, Bz--17028), 13478b (Bz--16918, Bz--16919), 22009b (Bz--16914, Bz--16915), 22022b (Bz--16916, Bz--16917), 24112b [Boschwezen 1313c] (Bz--16913), 27613b (Bz--16920, Bz--16921, Bz--16922), 35729b [2258] (B, Bz--17030, Ca--265973, Le, P), 36596b (Bz--17031, Bz--17032), 37868b [1595] (Bz--17029, Le), s.n. [10.I.86] (Bz--16986), s.n. [I.86] (Bz--16985); Kuhl & Van Hasselt s.n. (Le--908265-691); Kuntze 5921, in part (N, N); Lattuyse s.n. (Cb); Leeuwen-Reijnvaan s.n. [VIII.1909] (Bz--17007), s.n. [27.XI.1910] (Bz--17006, Bz--17008, Bz--17009), s.n. [6 December 1910] (Bz--16888), s.n. [20 Februarie 1912] (Bz--16974); Lörzing 862 (B); Mellerborg s.n. (S); Perrottet s.n. [1819] (Cb); Reinwardt s.n. (Le, S); Scheffer s.n. [5/10/1871] (Bz--16908); Schins 3 (Le); Slooten & Backer 35008 (Bz--16978); Teijsmann s.n. [1855] (Ut), s.n. [Poeloe Kellor] (Cl), s.n. [Semarang] (Bz--17021); Thunberg s.n. (S); Vaitz s.n. (Le); Valeton s.n. [Herb. Bot. Var. 236] (Bz--16983); Van Steenis 11551 (Bz--72762); Volkens 103 (B); Vorderman s.n. [Batavia] (Bz--17022, Bz--17023, Bz--17024, Bz--17025, Bz--17026), s.n. (Bz--16880, Bz--16881); Warburg 2388 (B); Zeylsta s.n. [1909] (Bz--16890); Zippelius s.n. (Le); Zollinger 2969 (V), s.n. [Tapera]

(Bm), s.n. (X). BATAVIA BAY ISLANDS: Leiden: Herb. Boerhage 103 (Le), s.n. [Leiden] (Le--908191-865). BANGUEY ISLAND: Castro & Melegrito 74 [1579] (Ca--241656), 1579 (Bm, Bz--16972), 1703 [198] (Bm, Ca--241334, Cb, W--1349682). SARAWAK: Native Collector 1616 (Bm). BORNEO: De Jong 477 [Boschproefst. BB.8292] (Bz--16833, Bz--16834); Hallier B.281 (Bz--16973); Van Ueurs 15 [91; Boschproefst. BB.9337] (Bz--17229). CELEBES: Boschproefst. BB.11441 (B, Ut--34196a), CC.11441 (Le), CC.15570 (Le); Forster s.n. [Celebes] (Le); Kijl de Jong 43 [E.29; Boschproefst. BB.19527] (Bz--16931); Kjellberg 2576 (Bz--16933); Koorders 19483b (Bz--17046, Bz--17047); Laleno 3 [Boschproefst. BB.11440] (Bz--16932), 4 [Boschproefst. BB.11441] (Bz--17042, Bz--17043); Noerkas 397 (Bz--17044, Bz--17045); Pesik 61 [Boschproefst. BB.15570] (Bz--17041); Rachmat s.n. [Vuuren 357] (Bz--16937, Bz--16938, Bz--16939, Le); Teijsmann 13766 (Bz--16942). KANGAEAN ARCHIPELAGO: Kangean: Backer 26991 (Bz--16923, Bz--16924, Bz--16925); Dommers 62 (Bz--17033), 86 (Bz--17035). Paliat: Backer 29502 (Bz--17034). LESSER SUNDA ISLANDS: Bali: Becking 39 (Bz--16926); Collector undesignated s.n. [Bali] (Le); De Voogd 1916 (Bz--17238), 2148 (Bz--16838), 2174 (Bz--17202). Banka: Btinnemeijer 1528 (Bz--17050, Bz--17051, Bz--17052, Le); Collector undesignated 1521 (Cl); J. Cook s.n. [Banka] (Bm); Teijsmann s.n. [Toboalsi] (Bz--17053). Billiton: Teijsmann s.n. [Blitoeng] (Bz--16956, Bz--16958). Timor: Gaudichaud s.n. [1818] (Dc); Talakua 27 [Boschproefst. BB.11791] (Bz--16927). MOLUCCA ISLANDS: Obi: Hulstijn 59 (Le). Santari: Saknan 59 (Bz--17038, Bz--17039). Taliboe: Hulstijn 114 (Le). Ternate: Beguin 932 (Bz--17040). Island undetermined: Collector undesignated s.n. (Le). NEW GUINEA: Northeastern New Guinea: Hellwig 212 (Bz--16928); Teijsmann 7459 (Bz--16929). NEW CALEDONIA: Le Rat 364 (B), 575 (B). AUSTRALIA: Western Australia: Preiss 1298 [Port Leschenault; seed 512] (B, Lu). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated s.n. (Le); Herb. Bogor. 17055 (Bz), 17956 (Bz); Herb. Linnaeus G.813, S.3 (Ls, N--photo, Z--photo); Herb. Petit-Thouars s.n. (P); Herb. Viborg s.n. (Cp); Née 56, in part (Q); Poiteau s.n. [St. Dom.] (Dc); Swartz s.n. [Herb. Rottler] (K); Tobler s.n. [Ulenge, 1913] (Dr); Warburg 15827 [Kantew] (B), 16939 [Hadjusia] (B).

AVICENNIA MARINA var. ACUTISSIMA Stapf & Moldenke ex Moldenke, Geogr. Distrib. Avicenn. 32, nom nud. (1939), Phytologia 1: 411. 1940.

Literature: Moldenke, Geogr. Distrib. Avicenn. 32. 1939; Moldenke, Phytologia 1: 411. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 54 & 86. 1942; Moldenke, Alph. List Cit. 1: 35, 40, 43, 80, 175, 220, & 253 (1946), 2: 536, 559, & 572 (1948), 3: 724, 832, 852, 857, & 976 (1949), and 4: 1141. 1949; Moldenke,

Known Geogr. Distrib. Verbenac., [ed. 2], 125 & 174. 1949; Moldenke, Résumé 160 & 440. 1959; Moldenke, Résumé Suppl. 1: 11 & 12. 1959.

This variety differs from the typical form of the species chiefly in its decidedly sharp-acute or acuminate leaf-apex. The branches, branchlets, twigs, peduncles, bractlets, prophylla, and fruit are also more plainly and regularly white-pulverulent. The petioles are quite uniformly very short, being only 1-6 mm. in length.

The type of the variety was collected by R. K. Bhide in the creek near Boriwli station on the B. B. & C. I. Railway, Salsette Island, Konkan, Bombay, India, on April 4, 1904, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. It had previously been misidentified as *A. alba* Blume and as *A. officinalis* L. Gammie states that the fruit is "yellow, quite smooth and polished". The fruit, insofar as I have observed it, is not beaked and is precisely similar to that seen in Stapf's *A. sphaerocarpa*. It has been collected in anthesis from March to May, and in fruit in August.

The H. H. Rich 798 collection is anomalous in having narrower and less sharply acute leaf-blades and less puberulence throughout, the puberulence being of a more sordid-gray color. One of the Gammie specimens shows only germinating seeds.

In all, 28 herbarium specimens, including the type, and 5 mounted photographs, have been examined.

Citations: PAKISTAN: Sind: Hooper 38716 (Cl, Cl), 38759 (Cl, Cl). INDIA: Bombay: E. de Beck s.n. [Poona] (V); J. Blakesley s.n. [seashore near Bombay, May 1928] (K); Burkill 15781 (Cl), 30185 (Cl); Gammie s.n. [Bassein, Aug. 1905] (Bm, K, K, K, K, K, N--photo, Z--photo); Haines 3461 (K); Hugel 2322 (V); Meebold 16507 (Cl, S); Proshad 30134 (B, Cl); H. H. Rich 798 (K); C. Ritchie s.n. [April 1854] (Ed); Stocks 318 (Cl, Cl); Woodrow 5 (Cl). State undetermined: Heyne 1814 (B). SALSETTE ISLAND: Bhide s.n. [Boriwli, 4-4-1904] (K--type, Mi--photo of type, N--isotype, N--photo of type, Z--photo of type).

AVICENNIA MARINA var. ANOMALA Moldenke, Geogr. Distrib. Avicenn. 35, nom. nud. (1939), Phytologia 1: 411. 1940.

Literature: Moldenke, Geogr. Distrib. Avicenn. 35. 1939; Moldenke, Phytologia 1: 411. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 70 & 86. 1942; Moldenke, Alph. List Cit. 1: 270. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 156 & 174. 1949; Moldenke, Phytologia 3: 381 & 382. 1950; Moldenke, Résumé 211 & 440. 1959.

This variety differs from the typical form of the species in its attenuated inflorescences with scattered or opposite pairs of flowers.

The type of the variety was collected by Diedrich Henne and Carl Wilhelmi on Low Island, Queensland, Australia, and is deposited in the Th. Bernhardi Herbarium at the Botanisches Museum in Berlin. In my original description, in Phytologia 1: 411 (1940),

I stated that Low Island was apart of Tasmania. I thought at that time that it was the Low Island which is east of Clarke Island in the groups of Flinders, Cape Barren, and Clarke islands north of the northeastern extremity of Tasmania, separated from the mainland of Tasmania by Banks Strait. Actually, Henne & Wilhelmi never collected in that area. The type locality for the variety is the Low Island north of Port Douglas, Queensland.

In regard to the reports sometimes seen that Avicennia occurs in Tasmania, I quote from a letter received by me on July 27, 1951, from my friend and colleague, Winifred M. Curtis, of the University of Tasmania at Hobart. She says "Avicennia does not occur in Tasmania or adjacent islands, the nearest locality is in Victoria, then further north, in New South Wales. But Ronald Gunn, an early colonist who collected assiduously and sent to Bentham much material used in the 'Flora Australiensis', wrote the following note on a sheet of Myoporum serratum: 'called in this colony MANGROVE'. Enquiry among some of the older settlers in Tasmania shows that the name 'Mangrove' is still used in this way."

In all, 2 herbarium specimens, including the type, and 3 mounted photographs have been examined.

Citations: LOW ISLAND: Henne & Wilhelmi s.n. [Herb. Bernhardi] (B—type, N—isotype, N—photo of type, S—photo of type, Z—photo of type).

AVICENNIA MARINA var. RESINIFERA (Forst.) Bakh., Bull. Jard. Bot.

Buitenz., sér. 3, 3: 210—211, pl. 16, fig. a & d—j. 1921.

Synonymy: Avicennia resinifera Forst., Plant. Escul. Ins.

Ocean. Austr. 72. 1786 [not A. resinifera Griff., 1854]. Avicennia tomentosa Sieber (in part) ex Presl, Bot. Bemerk. 99, in syn. 1844 [not A. tomentosa Blanco, 1845, nor Blume, 1918, nor Jacq., 1760, nor L., 1826, nor L. & Jacq., 1783, nor G. F. W. Mey., 1818, nor Nutt., 1947, nor Nutt. & Br., 1832, nor Roxb., 1835, nor Schau., 1940, nor Sw., 1864, nor Vahl, 1921, nor Weigelt, 1851, nor Willd., 1822]. Avicennia tomentosa var. australasica Walp., Repert. 4: 133. 1845. Avicennia tomentosa R. Br. ex Schau. in Mart., Fl. Bras. 9: 306, in syn. 1851. Avicennia resinosa Forst. ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Avicennia officinalis var. resinifera Biswas, in herb.

Literature: Forst., Plant. Escul. Ins. Ocean. Austr. 72. 1786; Forst., Fl. Ins. Austr. Prod. 45. 1786; J. F. Gmel. in L., Syst. Nat., ed. 13, 2 (2): 963. 1791; Willd., Sp. Pl. 3 (1): 395. 1801; Pers., Syn. Pl. 2: 143. 1807; R. Br., Prodr. Fl. Nouv. Holl., ed. 1, 1: 518. 1810; Lam., Encycl. Méth. Bot. Suppl. 1: 539. 1810; Rich., Voy. Astrolabe 195. 1832; Decaisne, Herb. Timor 74. 1836; Presl, Bot. Bemerk. 99. 1844; Miq. in Lehm., Pl. Preiss. 1: 353. 1845; Walp., Repert. 4: 133. 1845; W. Griff., Trans. Linn. Soc. Lond. Bot. 20: 6 & 7, pl. 1, fig. 3—5 & 13. 1846; W. Griff., Ann. Sci. Nat. Bot., sér. 3, 7: 11 & 12, pl. 1, fig. 3—5 & 13. 1847; Schau. in Mart., Fl. Bras. 9: 306—308. 1851; Schnitzlein, Iconogr. 2: pl. 137**. 1856; Miq., Fl. Ind. Bat. 2: 912. 1856;

Hook., Handb. New Zeal. Fl. 224 (1864) & 772. 1867; Palmer, Proc. Roy. Soc. N. S. Wales 17: 94. 1884; Kirk, For. Fl. New Zeal. 271--272, pl. 130. 1889; Jacks., Ind. Kew. 1: 254. 1893; Laing & Blackwell, Pl. New Zeal., ed. 1, 139, 253, & 351--361, fig. 114--118 (1906) and ed. 2, 353, 355, 357, & 359. 1907; T. G. B. Osborn, New Phytologist 13: 112 & 121, pl. 1, fig. 1. 1914; Ostenfeld, Dansk. Bot. Arkiv 2 (8): pl. 1, fig. 1. 1918; Cockayne, Distrib. Veg. Fl. N. Zeal. 14. 1919; Cockayne, N. Zeal. Pl., ed. 2, 35. 1919; A. A. Hamilton, Proc. Linn. Soc. N. S. Wales 44: 463 & 470--472, pl. 26, fig. 20. 1919; Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 203, 204, & 210--211, pl. 16. 1921; Lam & Bakh., Nova Guinea 14: 172. 1924; Cheeseman, Man. N. Zeal. Fl., ed. 2, 765. 1925; Laing & Blackwell, Pl. N. Zeal., ed. 3, 354 & 356--366, fig. 128--121. 1927; Ridl., Dispersal Pl. 310. 1930; Crevost & Pétolot, Bull. Econom. Indochine 37: 1297. 1934; Moldenke, Alph. List Common Names 20, 22, & 23. 1939; Moldenke, Geogr. Distrib. Avicenn. 33--35. 1939; Moldenke, Prelim. Alph. List Invalid Names 5 & 6. 1940; Laing & Blackwell, Pl. N. Zeal., ed. 4, 373--384, fig. 140--143. 1940; Kanehira & Hatusima, Bot. Mag. Tokyo 56: 112. 1942; Moldenke, Alph. List Invalid Names 5. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 64--66, 68--70, & 86. 1942; Moldenke, Phytologia 2: 92. 1944; Moldenke, Alph. List Cit. 1: 4, 16, 27, 29--31, 34, 37, 38, 46, 50, 51, 59, 71, 89, 94, 100, 113, 115, 117, 119, 120, 136, 141, 160, 161, 166, 170, 208, 210, 212, 226, 227, 233, 235, 249, 250, 270, 275, 277, 286, 295, & 312 (1946), 2: 354, 361, 416, 433, 435, 439, 449, 456, 482, 496, 500--503, 537, 538, 557, 558, 572, 580, 593, 602, 614, 639, & 644 (1948), 3: 655, 685, 699, 702, 703, 724, 739, 747, 750, 752, 759, 761, 776, 782, 793, 811, 813, 827, 828, 841, 842, 852, 856, 865, 906, 926, 935, 941, & 957 (1949), and 4: 984, 987, 997, 1010, 1017, 1021, 1054, 1093, 1094, 1119, 1123, 1168, 1175, 1205, & 1223. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 144, 146--148, 150--152, 155, 156, & 174. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 3. 1949; Moldenke, Phytologia 3: 381 & 382 (1950), 4: 88 (1952), and 4: 193 & 195--197. 1953; Moldenke, Résumé 187, 189, 194, 196, 198, 200, 204, 205, 207, 211, 236, & 440. 1959; Moldenke, Résumé Suppl. 1: 14 & 15. 1959.

Illustrations: Kirk, For. Fl. N. Zeal. pl. 130. 1889; Laing & Blackwell, Pl. N. Zeal., ed. 1, fig. 114--118 (1906) and ed. 2, 353, 355, 357, & 359. 1907; T. G. B. Osborn, New Phytologist 13: pl. 1, fig. 1. 1914; Ostenfeld, Dansk. Bot. Arkiv 2 (8): pl. 1, fig. 1. 1918; Cockayne, N. Zeal. Pl., ed. 2, 32. 1919; A. A. Hamilton, Proc. Linn. Soc. N. S. Wales 44: pl. 26, fig. 20. 1919; Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: pl. 16, fig. a & d--j. 1921; Laing & Blackwell, Pl. N. Zeal., ed. 3, fig. 128--131 (1927) and ed. 4, fig. 140--143. 1940.

This variety differs from the typical form of the species in its branches, branchlets, and twigs being much more uniformly and regularly glabrous or subglabrate and very shiny, purple or black in drying, usually pulverulent only at the nodes or on very young parts, the leaf-blades more decidedly long-acuminate at the base, regularly very densely impressed-punctate above,

and mostly much more sordid, yellowish, or fulvous beneath; the axillary inflorescences often paired, frequently subtended by large foliaceous bracts; the peduncles often greatly abbreviated; and the bractlets, prophylla, calyx, and rachis more densely pubescent or even velutinous with brownish or fulvous-flavitious hairs.

It is said by collectors to be a slender tree, to 23 m. tall, with a bole to 6.5 m. tall clear of branches, to 30 cm. in diameter at breast height, surrounded by slender erect pneumatophores; bark about 3 mm. thick, the outer bark gray or pinkish-brown, greenish-brown when rubbed, fairly smooth, the inner bark green on the back and white within; wood straw-colored; flowers honey-scented; corolla yellow or orange; fruit pointed at the apex, more or less heart-shaped, very pale-brown, about 3 cm. long and 2.2 cm. wide at the widest part. The leaf-blades vary from broadly elliptic (as in the so-called var. intermedia and some specimens of A. sphaerocarpa) and rounded at the apex to narrow and greatly elongate and sharply acute at the apex. The narrow and greatly elongate material closely approaches A. eucalyptifolia and may more properly belong there. Bakhuijsen in Bull. Jard. Bot. Buitenz., sér. 3, 3: 210 (1921) reduces A. eucalyptifolia, A. officinalis var. eucalyptifolia, A. mindanaense, and A. alba var. acuminatissima to synonymy under A. marina var. resinifera. However, I regard A. mindanaense as typical A. marina, and separate the others as A. eucalyptifolia. On pages 210--211 he describes var. resinifera, but his description is based on material which I regard as representing not only this variety [the Atje, Jaheri, and Rockhampton specimens], but also some which is typical A. marina [Elmer 11990, in part, and Curran 17337] and some which is A. eucalyptifolia [Elmer 11990, in part, Robinson 1862, Branderhorst 227, Koch s.n., and Versteeg 1893]. His description and discussion are as follows: "Folia elliptico-oblonga, 5 multoties longiora, utrinque attenuata subtus viridi-canescens, 7--16.5 cm. longa, infra medium 1.5--3.5 cm. lata; petiolo 1--1.5 cm. longo. Panicula parva, foliata, non vix ramosa, bracteolis subfoliaceis saepe involutis. Inflorescentia partialis compacta, cephaloidea vel pyramidata, 0.5--1.2 cm. longa, 2--12 flora. Flores expansi mediocres, 0.5--0.7 cm. longi, 0.5--0.7 cm. diam. Corolla tubo 0.3 cm. longo; laciniis 2.5--3 cm. longis, 0.2--0.25 cm. latis. Stamina filamentis 0.20--0.22 cm. longis; antheris 0.10--0.12 cm. diam. Pistillum corollae tubo aequale vel vix longius, conspicuum. Ovarium brevi tomentosum; stylo brevi; stigmate post corollae lapsum exserto. Fructus ovoideus. -- Cetera varietate [alba] similia. Remarks. Description exclusively made after dried material. -- This variety approaches the var. alba (Bl.) Bakh. because of the shape of the leaves; but it differs from it especially in having the axillary and terminal inflorescences consisting of capitules; the bracts are less developed, generally curved, little leaves. [See also H. J. Lam. Verb. pl. III fig. 1, p--t]. The appearance of these curved

bracts is indeed a characteristic of the entire capitata group. — The name A. resinifera was given by Forster on account of the supposed formation of resin in these trees. According to Cheeseman, this affirmation is erroneous, and this resin must have been the edible kaurigum of the Maoris, which comes from the Agathis australis Salisb. (Cowriespruce). The Avicennia trunk secretes in fact some resin, possibly only by a wound, as I observed myself in Tandjong-Priok with the var. intermedia (Griff.) Bakh. — Heyne in Nutt. Plant. Ned. Ind. IV [1917] p. 124, speaks on Boorsma's authority, of tough, odoriferous and bitter resin which is used to prevent pregnancy, a remedy which is supposed to be harmless also when used continuously. Arabian writers too, speaking of Avicennias along the coast of Arabia, mention very often indeed the resin formed by these trees." He gives as geographic distribution of the variety: Victoria, New South Wales, Queensland, New Zealand, New Caledonia, Galapagos Islands, New Guinea, Amboina, Timor, Biliton, Mindanao, and Panay. He adds that "According to Bailey the wood is strong, hard and durable, for which reason it is used in Australia for different purposes; besides the fruit is eaten toasted. The planting of it is recommended against coast erosion." His Galapagos record is, of course, erroneous and applies to A. germinans (L.) Stearn. The Amboina record, also repeated by me in some of my previous publications, is based on C. B. Robinson 1862, which I now regard as A. eucalyptifolia.

In previous publications I regarded A. mindanaense and A. mindanaensis as synonyms of A. marina var. resinifera, but I now regard the collection on which these names are base as being typical A. marina. Similarly, I previously annotated Copeland 558, Elmer 11990, and Merrill 1179, 2413, and 2585, all from the Philippine Islands, as being var. resinifera, but I now regard them as typical A. marina. Miquel, in Fl. Ind. Bat. 2: 912 (1856), places A. resinifera Forst. as a synonym of A. officinalis L. In fact, specimens of var. resinifera have been abundantly misidentified in herbaria as A. officinalis L., A. tomentosa L., and even as Clerodendrum inerme (L.) Gaertn., Vitex trifolia L., Vitex littoralis A. Cunn., and "Caprifoliaceae".

The Koch s.n. collection from Papua seems definitely to consist of a mixture of var. resinifera and A. eucalyptifolia. Kanehira & Hatusima, in their 1942 reference cited above, cite their no. 14179 from New Guinea as var. resinifera, but this collection has not as yet been seen by me.

According to various collectors, var. resinifera inhabits muddy shores. It is said to be common in dense mangrove formations on river margins in Queensland, on mudflats along tidal rivers in New South Wales, and to be common on the seashore and in the muddy parts of sea lagoons on Malaita Island. White says that it is found "along the harbour front, a little below high-tide level; tree about 30 feet tall; leaves dark green above, whitish underneath; flowers orange, honey-scented." It has been collected in

anthesis in March, September, and October, and in fruit in March and August. Campania 127 has its leaves much galled.

Walpers' original description of his A. tomentosa var. australasica is worth repeating here: "Folia ovali-lanceolatis acuminatis vel obtusis longissimus in petiolum attenuatis, supra nitidis, infra glaucescenti-tomentosis. Folia 2—3—3.5 pollicaria, pollicem lata, basi longe attenuata, petiolis 6—9 lin. vel etiam pollicaribus. A. resinifera Forst.....Crescit in Nova Hollandia." Apparently this is merely a new name and status for Forster's A. resinifera and therefore based on Forster's type. If this is so, then under a strict interpretation of the present International Rules, the epithet "australasica" would have to be accepted as the valid name for this taxon since it is the earliest name applied to it in the varietal category. The name of the plant would then become Avicennia marina var. australasica (Walp.) Moldenke, comb. nov. [Avicennia tomentosa var. australasica Walp., Repert. 4: 133. 1845].

The binomial, A. tomentosa Sieber, is based in part (p. 99) on Sieber Fl. Nov. Holl. 268, and insofar as that material is concerned is therefore a synonym of var. resinifera. The remainder of the material to which Sieber applied this binomial (pp. 98—99) is his Fl. Mart. 318, which is A. germinans (L.) Stearn. The Barclay s.n. collection from Celebes was annotated by Biswas as "A. officinalis var. resinifera", but I cannot find that he ever validly published this trinomial combination.

The Oldfield s.n. and Henne & Wilhelmi s.n. collections from Low Island are actually not from the Low Island which is just north of the northeast extremity of Tasmania, as previously thought by me, but are from the Low Island north of Port Douglas, Queensland.

A. marina var. resinifera has quite a few common and vernacular names, among which are "Australian grey mangrove", "bootharoo", "brappat", "bu-bula", "daon kaju buluh ajam", "egate", "e-pum eran", "grey mangrove", "kaloh", "kum moo-roo", "Malacca baen", "manaoua", "manawa", "mangi-mangi", "mangrove", "native mangrove", "New Zealand mangrove", "parpoon", "rhai-ite", "sotan", "tagon-tagon", "tchunt-chee", and "white mangrove". It is worth noting that the name "mangrove" as also applied to all members of the genus and to A. germinans in particular. "White mangrove" is applied also to Laguncularia racemosa Gaertn. f. The "maraban" mentioned by Bakhuizen on page 211 of his 1921 work, cited above, applies to typical A. marina.

Stapf considered the taxon being discussed here as sufficiently distinct to warrant a specific name, and so annotated the Kew specimens. Seedlings may be seen on the Gunn specimen at Kew. The surname of the collector, Jean Armand Isidore Pancher, is misspelled "Pansher" in the Leiden herbarium.

Hooker, in his Handb. N. Zeal. Fl. 224 (1864), records "A. officinalis" (his name for A. marina var. resinifera) from a Chatham Island on the authority of Dieffenbach. Cheeseman, in

his *Man. N. Zeal. Fl.*, ed. 2, 765 (1925), asserts that this is undoubtedly an error, since *Avicennia* does not occur on Chatham Island. Dieffenbach's plant was probably a sterile specimen of *Olearia traversii* F. Muell. in the *Carduaceae*. *A. germinans* (L.) Stearn, however, does grow on the Chatham Island in the Galapagos group and specimens of it from there have been misidentified as *A. officinalis*. It is probable that the "Galapagos Islands" record given by Bakhuizen van den Brink for *A. marina* var. *resinifera* probably stems back to this confusion of islands.

Laing & Blackwell, in their 1927 reference cited above, point out that "Mangroves have been generally regarded as the pariahs of the forest and *A. officinalis* [that is, *A. marina* var. *resinifera*] has not escaped the usual condemnation. Thus, the following impassioned but somewhat inaccurate description of it occurs in one of the earliest New Zealand novels: — 'Oh! those mangroves. I never saw one that looked as if it possessed a decent conscience. Growing always in shallow stagnant water, filthy black mud, or rank grass, gnarled, twisted, stunted, and half bare of foliage, they seem like crowds of withered, trodden down old criminals, condemned to the punishment of everlasting life'.....Doubtless much of the evil reputation of the mangrove forest is due to the fact that, to its presence, has long been erroneously attributed the prevalence of malaria in tropical river estuaries. Miasmatic vapours were supposed to arise from the pestilential mangrove swamps, and spread their contagion around.....Fortunately, New Zealand does not possess the malaria carrying mosquito (*Anopheles*), and so her mangrove forests, in spite of their foul appearance, are no more dangerous to human life than any other part of the country. Indeed, at high tide, a mangrove swamp is often a pleasant place to punt in, for then the somewhat sickly odour of the mud, is replaced by the fresh smell of the sea.....The twisted and gnarled stems and roots give to the tree an unwarranted appearance of age, so that even the youngest mangrove looks old. Barnacles and oysters fix themselves upon the roots which are uncovered by the withdrawal of the tide; eels wriggle in and out of their holes, and the mass of fibrous rootlets which form a mat beneath the mud, provides dwelling-places for innumerable mud-coloured crabs. These are sought after, not only by the sober-hued wekas, but also by the beautiful kingfishers."

Miss L. B. Moore, in a letter to me dated August 6, 1959, states that "there is no reason to believe that *A. Richard* was ever in this country, and the Fosters visited only two South Island localities where it seems quite impossible that they could have seen mangroves." It would appear, therefore, that the specimens cited to these collectors below were probably sent to them by other collectors. The Banks & Solander, Bennett, Berggren, Collector undesignated, Cunningham, Drake, Forster, Hillebrand, Hooker, Httgel, Lesson, Lynd, Meebold, Moricand, Myers, Philson, Raoul, Richard, and Wilkes specimens cited from New Zealand's North Island below do not state on their labels on what island they were collected. However, Miss Moore says it can be safely assumed that all came from North Island.

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CERTAMEN MELASTOMATACEIS VI.

John J. Wurdack

SANDEMANIA COGNIAUXII (Ule) Wurdack, comb. nov.

Leandra cogniauxii Ule, Notizbl. Bot. Gart. Berlin 6: 367. 1915.

Leandra purpurascens Cogn., Bot. Jahrb. 42: 139. 1908, non L. purpurascens (DC.) Cogn. (1886).

Sandemania lilacina Gleason, Kew Bull. 480. 1939.

An isotype (Weberbauer 4604, G-DC) has been examined, as well as original material (NY) of S. lilacina. Cogniaux did not observe the 4-merous flowers, Macairea-like stamens, and superior 2-celled ovary of the Weberbauer material. Both Sandeman's and Weberbauer's collections came from the same immediate area in Dept. San Martin, Peru.

TIBOUCHINA CLAVATA (Pers.) Wurdack, comb. nov.

Melastoma clavata Pers., Syn. Plant. 1: 476. 1805.

Melastoma argentea Desr., Lam. Encycl. Meth. Bot. 4: 45. 1796, non Sw. (1788).

Melastoma holosericea Sw., Obs. Bot. 176. 1791, non M. holosericea L. (1753).

Persoon renamed Melastoma argentea Desr. because of the earlier M. argentea Sw. Melastoma holosericea L., from both Linnaeus' and Plukenet's descriptions, obviously is not the same as the Tibouchina species photographed in the Linnaean Herbarium (Savage Catalogue 559.5); this specimen was No. 7 of the Arduino List sent to Linnaeus in 1761 and determined by him in 1763. Apparently a duplicate of this collection, along with a Banks and Solander specimen, formed the basis of Swartz's description; also Swartz, from his reference to the Systema Vegetabilium (1784), was only amplifying, albeit incorrectly, the Linnaean and Murrayan descriptions of Melastoma holosericea. Perhaps a specimen of Miconia holosericea (L.) DC. may exist among the Swedish Linnaean collections. Even though DeCandolle misidentified Melastoma holosericea L., the transfer to Miconia should be credited to him and not, as indicated by Cogniaux (DC. Mon. Phan. 7: 732. 1891), to Triana. For typification, the Commerson holotype of T. clavata is much more adequate than the Arduino scraps.

LEANDRA CUATRECASASII Wurdack, sp. nov.

L. nervosae Cogn. affinis, sed cum floribus et caulibus hypanthiisque dense setulosis vel setosis.

Frutex; rami teretes cum petiolis inflorescentiis hypanthiisque dense stellato-furfuracei et dense fusco-setosi vel setulosi. Petioli 4-15 mm. longi; lamina 4-11 X 1.5-3 cm. subcoriacea lanceolata vel anguste oblongo-ovata apice anguste acuta basi rotundata ciliolata-serrulata 5-nervata, supra primum sparse strigulosa (praecipue marginem versus) demum glabrata, subtus in nervis primariis secundariisque modice stellulato-furfuracea et modice vel dense setosa vel setulosa superficie glabra vel sparse inconspicueque stellulato-furfuracea. Panicula 4-9 cm. longa oblonga; flores 5-meri plerumque breviter (2-5 mm.) pedicellati; bracteolae inconspicuae ca. 1 mm. longae oblongae vel lineares apice setiferae. Hypanthium 3 mm. longum dense stellato-furfuraceum et dense vel densiuscule setosum vel setulosum; calycis lobi interiores 0.6-0.8 mm. longi oblongo-ovati hebeti-acuti basin versus stellulato-furfuracei, dentibus exterioribus 0.3-0.6 mm. eminentibus oblongis carnulosis extus setuliferis. Petala alba 4.5-6 X 1.5-2 mm. oblongo-ovata apice vix acuminata utrinque papilloso-puberula. Filamenta 2-2.3 mm. longa modice glanduloso-puberula; antherae 1.7-2 mm. longae oblongae, connectivo non prolongato basi dorsali vix elevato. Stylus 6 mm. longus sparse vel modice glanduloso-puberulus; stigma truncatum; ovarium 3-loculare ad medium adnatum apice paucisetulosum et sparse glanduloso-puberulum; semina laevia 0.3-0.4 mm. longa.

L. cuatrecasasii ssp. *cuatrecasasii*

Ramorum hypanthiorumque pili densissimi 3-4 mm. longi.

Type Collection: *J. Cuatrecasas* 8454 (holotype US 1797083), collected at Gabinete, eastern cordillera, Dept. Huila-Com. Caquetá frontier, Colombia, alt. 2300-2450 m., Mar. 22, 1940. "Frutex ramoso; cáliz purpúreo; corola blanca."

Paratypes: Com. Caquetá: Río Hacha below Gabinete, alt. 2100-2250 m., *Cuatrecasas* 8536 (US); between Garzón and Florencia, alt. 2000 m., *H. L. Mason* 13962 (US).

L. cuatrecasasii ssp. *occidentalis* Wurdack, ssp. nov.

Ramorum hypanthiorumque pili densi 1-1.5 mm. longi.

Type Collection: *J. A. Molina & F. A. Barkley* 18A314 (holotype US 2102927), collected in subpáramo east of Sonsón, Dept. Antioquia, Colombia, alt. 2800 m., Oct. 30, 1948.

Paratypes: Colombia: Río San Rafael below Cerro Tatama, Dept. Caldas, alt. 2500-2800 m., *F. W. Pennell* 10397 (US); Mozoco, Moras Valley, Dept. Cauca, alt. 2600 m., *H. Pittier* 1325 (US).

L. nervosa, ranging from Colombia to Peru at elevations of 1500-2000 m., shares the feature of glandular-puberulous filaments and style with *L. cuatrecasii*, but completely lacks hypanthial setae and has petals only 3 mm. long. Isotypes (US) of *L. lehmannii* Cogn. resemble vegetatively *L. cuatrecasii* ssp. *occidentalis*, but show glabrous filaments and style as well as petals only 2.5-3 mm. long; probably *L. lehmannii* should be allied (and perhaps united) with the ill-defined species-complex *L. subseriata* (Naud.) Cogn.-*L. melanodesma* (Naud.) Cogn.

MICONIA PICTA (Vahl) Wurdack, comb. nov.

Melastoma picta Vahl, Eclog. 3: 15. 1807.

The name *Miconia cinnamomifolia* (DC.) Naud. is properly applied to the southeast Brazilian species treated by Cogniaux as *M. candolleana* (DC.) Tr. (Trans. Linn. Soc. Bot. 28: 117. 1871), a later homonym of *M. candolleana* Naud. (Ann. Sci. Nat. Ser. 3, 16: 244. 1851). *M. cinnamomifolia* (Jacq.) Tr. (Trans. Linn. Soc. Bot. 28: 101. 1871) is a later homonym of *M. cinnamomifolia* (DC.) Naud. (Ann. Sci. Nat. Ser. 3, 16: 168. 1851). Were it not for the availability of Vahl's epithet, *M. candolleana* Naud. would be the proper name for this West Indian species.

MICONIA FERREYRAE Wurdack, sp. nov.

Sect. *Amblyarrhena*. Ex descr. *M. retusae* Pilger affinis, sed cum foliis longioribus subtus in venis inconspicue cum pilis stellatis albidis obsitis.

Rami primum vix compressi demum teretes cum petiolis foliorum venis primariis secundariisque subtus inflorescentiisque sparse cum pilis albidis gracili-stellatis appressis obsiti demum glabrati. Folia sessilia; lamina 15-25 X 2-3.5 cm. lanceolata apice graditer anguste longeque acuminata basi ad 1 cm. cordato-amplexicaulis trinervata venis secundariis 1-2 mm. inter se distantibus nervis tertiariis sublaevae reticulatis, supra et subtus primum cum pilis albidis stellatis modice obsita demum nervis subtus exceptis glabrata, subcoriacea integra. Panicula 10-12 cm. longa; flores sessiles 4-meri; bracteolae 1.5 mm. longae ovatae persistentes ad hypanthii basim insertae. Hypanthium 3 mm. longum glabrum; calycis lobi 1 mm. alti triangulares acuti, dentibus exterioribus apiculatis dentes interiores aequantibus. Petala 3 X 2-2.2 mm. obovata asymmetricice rotundata et retusa laevia. Filamenta 2.5-3 mm. longa glabra; antherae 2 mm. longae anguste oblongae apice uniporosae, connectivo basi non producto cum filamento simpliciter articulato. Stylus 6 mm. longus; stigma truncatum non expansum; ovarium 4-loculare 1/3 liberum, apice truncatum et sparse cum glandulis

sessilibus rubris obsitum.

Type Collection: Ramon Ferreyra 4297 (holotype US 2029041), collected "abajo de Divisoria, cerca a Sinchono, Prov. Coronel Portillo", Dept. Loreto, Peru, alt. 1300-1400 m., July 21, 1948. "Arbusto 1.5-2 m. Flores lilas hasta rosadas".

Paratypes: Dept. San Martin, Peru: between Sinchono and Boquerón, Ferreyra 1132 (US); near Boquerón, H. A. Allard 22073 (US).

M. retusa has leaves only 5.5-7 cm. long. Pilger's and Macbride's placement of *M. retusa* in Sect. *Amblyarrhena* certainly seems preferable to Gleason's disposition (as *M. macbridei* Gl.) in Sect. *Chaenopleura*. The two relatives, along with the next-described species, are generally related with the 4-merous species of Sect. *Amblyarrhena*, with anthers resembling those of the Cuban *M. androsaemifolia* Griseb.

MICONIA CONDYLATA Wurdack, sp. nov.

M. ferreyrae Wurdack affinis, sed cum nodis stipuliformate incrassatis et foliis petiolatis.

Pubes ut in *M. ferreyrae*. Rami teretes ad nodos notabile incrassati annulo corneo 1-1.5 cm. diam. Petioli 1-3 cm. longi; lamina 11-22 X 2.5-5 cm. oblongo-lanceolata apice sensim longe angustaque acuminata basi obtusa vel vix rotundata coriacea integra trinervata nervis duobus lateralibus inframarginalibus nervis secundariis 2-5 mm. inter se distantibus nervis tertiariis laxe reticulatis. Panicula 9-18 cm. longa ampla densiuscule stellato-furfuracea. Flores 4-meri glabri sessiles; bracteolae 0.7-1.5 mm. longae ovatae caducae. Hypanthium 3 mm. longum; calycis lobi 0.5 mm. alti late triangulares, dentibus exterioribus apiculatis dentes interiores aequantibus vel vix (0.2 mm.) superantibus. Petala 2-2.5 X 1.5 mm. oblongo-obovata apice rotundata et retusa. Filamenta 2-2.5 mm. longa; antherae 2-2.3 mm. longae anguste oblongae apice uniporosae, connectivo basi non producto cum filamento simpliciter articulado. Stylus 4.5 mm. longus; stigma truncatum non expansum; ovarium 4-loculare 1/3 liberum apice truncatum glabrum.

Type Collection: Ramon Ferreyra 1105 (holotype US 2057975), collected between Sinchono and Boquerón, Dept. San Martin, Peru, Aug. 15, 1946. "Shrub 1.5-2 m. high; flowers rose; fruit red".

Paratype: Rosa Scolnik 1125 (US), collected between Kms. 220 and 225, road between Huánuco and Pucallpa, Dept. Loreto, Peru.

While the vegetative distinctions between *M. ferreyrae* and *M. condylata* are most striking, there are only minor floral differences, with *M. ferreyrae* having slightly longer calyx lobes. The extreme cupular-tumid nodal development in *M. ferreyrae* serves as an ample differentiation from the other 4-merous species of *Miconia* Sect. *Amblyarrhena*.

MICONIA MICAYANA Wurdack, nom. nov.

Amphitoma flavescens Gleason, Bull. Torrey Club 52: 378. 1925.

The genus Amphitoma differs in no way from several species of Miconia Sect. Cremanium. The closest relative of M. micayana is M. compressicaulis Wurdack, from the same area in Colombia, and M. gonioclada Tr. of Ecuador, both with glabrous foliage and hypanthia and non-emergent external calyx teeth as well as relatively broader leaf blades. One paratype of Amphitoma flavescens, Killip 7930 (US), probably represents an undescribed relative of these three species; the lower leaf surface has stipitate-stellate hairs, the upper surface lacks the numerous subepidermal yellow papillae characteristic of both its Colombian relatives, and the external calyx teeth are non-emergent as in M. compressicaulis. The material is somewhat imperfect for adequate description.

MICONIA HAUGHTII (Gleason) Wurdack, comb. nov.

Pachydesmia haughtii Gleason, Phytologia 2: 430. 1948.

The relationship of M. haughtii with M. superposita Wurdack is intimate. In M. haughtii, cauline swellings below the petiole bases are strongly developed, the leaf blades are larger and basally rounded, and the basal strongly irregularly lobed connective appendages are 1.5-1.7 mm. long in total; M. superposita lacks cauline scutums, the relatively narrower smaller leaf blades are broadly acute at the base, and the lobed basal connective appendages are only about 0.8 mm. long. M. turgida Gleason resembles M. haughtii in the cauline scutal development, but otherwise is more distantly related. M. haughtii represents a slight additional development of anther sterilization over M. superposita.

CLIDEMIA CHOCOENSIS Wurdack, sp. nov.

Sect. Staphidium. C. conglomeratae DC. affinis, sed cum foliis integris, ramulorum pilis primum albidis non vel vix ciliatis, calycis lobis interioribus intus dense stellulato-puberulis.

Frutex; ramuli novelli cum petiolis hypanthioque dense cum pilis flaccidis albidis 1-2 mm. longis laxe erectis et densissime cum pilis brevibus obtusis obsiti. Folia membranacea vix (ad 1 cm.) petiolata in eodem jugo disparilia; lamina 12-18 X 5.5-8.5 cm. vel 5.5-9 X 2-4.5 cm. elliptico-obovata apice breviter (0.5-1.5 cm.) acuteque acuminata basi late acuta, 5-nervata cum nervis exterioribus marginalibus dilutis nervis secundariis distinctis ca. 4-8 mm. inter se distantibus tertiariis laxe rectangulato-reticulatis, marginibus integris vel indistincte distanterque undulato-serrulatis, supra primum sparse albido-lanosa et modice stellulato-furfuracea demum

glabrata, subtus in nervis primariis modice albido-lanulosa et dense stellulato-furfuracea in nervulis modice stellulato-furfuracea alioqui glabra. Flores 5-meri sessiles in foliorum axillis glomerati cum bracteis parvis occultis. Hypanthium 3 mm. longum; calycis lobi interiores 1 mm. alti ovati apice rotundati dense stellulato-furfuracei, lobis exterioribus 0.5-1 mm. eminentibus acutis dense flaccido-setulosis. Petala 1.5 X 1 mm. ovato-oblonga obtusa. Antherae 1 mm. longae oblongae basi vix prolongatae dorsaliter cum dente acuto glanduloso 0.3 mm. longo obsitae. Stylus 3 mm. longus; stigma truncatum; ovarium 5-loculare ad medium inferum apice truncatum et densiuscule cum glandulis sessilibus obsitum.

Type Collection: E. P. Killip & Hernando Garcia 33520 (holotype US 1770455), collected in dense forest along Quebrada Jellita, Bahia Solano, Int. El Choco, Colombia, alt. 50-100 m., Feb. 22, 1939.

The Guianan C. conglomerata has notably ciliolate brown branchlet pubescence, crenate-serrate leaf margins, interior calyx lobes glabrous except for the ciliate margins, non-protruding external calyx teeth, and a densely setose ovary apex. In C. conglomerata, the glabrous stamen connective has a very short truncate dorso-basal appendage. The glandular stamen connectives of C. chocoensis are like those of C. densiflora (Standl.) Gleas., a Central American species with different pubescence and 4-merous flowers.

CLIDEMIA HAUGHTII Wurdack, sp. nov.

Sect. Staphidium. C. reitzianae Cogn. et Gleas. ex Gleas. in aspectu affinis, sed cum foliis supra glabris et floribus maioribus cum toro glabro.

Rami teretes cum petiolis densissime furfuraceo-tomentosi et sparse rubro-setosi. Folia membranacea disparilia 1-3 cm. vel 0.3-0.7 cm. petiolata; lamina 11-17 X 5-8.5 cm. vel 1.5-3 X 1-2.5 cm., maiora elliptica apice breviter (ad 0.7 cm.) lateque hebeti-acuminata basi rotundata breviter (ad 5 mm.) 5-plinervata, minora orbiculari-ovata apice late acuta vel obtusa basi vix cordata, prominenter ciliata et vix denticulata nervis tertiariis laxe reticulatis, supra glabra, subtus in nervis primariis dense furfuraceo-tomentosa et sparse gracili-setosa in superficie laxe gracili-setosa. Panicula furfuracea subsessilis pauciflora ca. 1.5 cm. longa. Flores 5-meri 3-5 mm.-pedicellati; bracteolae inconspicuae 0.2-0.3 mm. longae ovatae apice setiferae. Hypanthium 4 mm. longum oblongum sparse stellulato-furfuraceum, modice rubro-setosum, et dense resino-glandulosum; calycis lobi 0.5 mm. alti rotundati, dentibus exterioribus brevissimis tuberculi-formibus setiferis; torus glaber vel inconspicue furfuraceus. Petala 2 X 1.8 mm. obovata oblique truncata granulosa.

Filamenta 2 mm. longa; antherae 3 mm. longae subulatae, connectivo basi 0.2 mm. prolongato et dorsaliter cum appendice truncata 0.5 mm. longa. Stylus 9 mm. longus; stigma truncatum; ovarium 5-loculare omnino inferum apice resino-glandulosum.

Type Collection: Oscar Haught 2193 (holotype US 1742423), collected at the headwaters of Dorada Creek 12 km. south of Raizudo, vicinity of Puerto Berrio between Carare and Magdalena rivers, Dept. Santander, Colombia, alt. 300 m., May 6, 1937. "Much-branched shrub 1 m. high; flowers and immature fruit red. Rich soil along streams".

The Costa Rican relative has the same vegetative aspect and the same pubescence types as C. haughtii, but the leaves are constantly sparsely to moderately lax-setose above, the hypanthium only 3 mm. long, the anthers (fide Gleason) only 1.9 mm. long, and the torus densely pubescent. Haught 2193 was distributed as C. dentata D. Don, a species with prominent external calyx teeth. From the type photograph (Macbride 17308), C. purpurea D. Don, of Ecuador, must be a close relative of C. reitziana; no recent collections referable to C. purpurea have been seen.

CLIDEMIA GARCIA-BARRIGAE Wurdack, sp. nov.

C. pittieri Gleas. distante affinis sed cum foliis parvioribus pubescentibus. Rami teretes cum petiolis foliis inflorescentiisque modice setosi cum pilis nigrescentibus 1.5-3 mm. longis et sparse cum glandulis rubris sessilibus obsiti. Folia subcoriacea disparilia subsessilia ad 3 mm. petiolata; lamina 6-8 X 2-3.5 cm. vel 2-3 X 1.5-2.5 cm., maiora oblonga apice abrupte angustaque per 1-1.5 cm. acuminata basi rotundata 5-nervata, minora late ovata breviter (2 mm.) hebeti-apiculata 3- vel sub 5-nervata, ciliata integra nervis secundariis tertiariisque non evolutis. Inflorescentia e basi simpliciter trifurcata ramis subequalibus 2-4 cm. longis. Flores 5-meri in ramis racemosi 1-2 mm. pedicellati; alabastra cum bracteolis duabus caducis 2.5-3 X 2-2.5 mm. ellipticis vel suborbicularibus extus sparse strigosis prominenter ciliatis 0.5 mm. infra hypanthium insertis involucreta. Hypanthium 1-1.2 mm. longum sparse setosum vel glabrum cum glandulis rubris sessilibus sparse obsitum; calycis lobi 0.8-1 mm. longi et lati ovati apice late acuti vel rotundati, dentibus exterioribus apice breviter setiferis quam dentibus interioribus vix brevioribus. Petala 1.5-2 X 1.5-2 mm. orbicularia. Filamenta 1.5 mm. longa, basi 0.7 mm. lata; antherae 0.5 X 0.5 mm. apice truncatae, connectivo basi vix prolongato dorsaliter et ventraliter tuberculato. Stylus 2 mm. longus; stigma truncatum; ovarium 3-loculare omnino inferum apice glabrum et 10-costatum.

Type Collection: H. Garcia-Barriga 13116 (holotype US 1987150), collected between Altaquer and Ricaurte along the

road to Barbacoas, Dept. Nariño, Colombia, alt. 1140-1300 m., Aug. 3-5, 1948. "Arbusto 2 m.; flores blancas".

The postulated glabrous Panamanian relative has in common with *C. garcia-barrigae* foliar dimorphism and floral details, with both species having stamens suggestive of *Miconia* Sect. *Cremanium*. In floral details, both are suggestive of the genus *Killipia* but are radically different vegetatively.

CLIDEMIA ALLARDII Wurdack, sp. nov.

C. tococoideae (DC.) Gleas. et *C. crenulatae* Gleas. affinis, sed cum inflorescentia ampliore, calycis dentibus exterioribus hypanthio cauleque dense cum pilis brevibus ramulosis obsitis.

Frutex 1.5-3 m.; ramuli cum vesicis petiolis inflorescentiis calycis dentibus exterioribus hypanthiisque dense setosi (pilis gracilibus 2-6 mm. longis p. p. glanduliferis) et dense cum pilis plumosis ad 0.5 mm. altis obsiti. Vesicae in paribus infra nodos ad petiolorum basim insertae 0.7-1 cm. longae ellipsoideae. Folia isomorphica vel vix anisomorphica; petioli infra inflorescentiam 3.5-7.5 cm. longi, ad inflorescentiam multo breviores; laminae maturae membranaceae plerumque 9-20 X 7-15 cm. late ovatae apice breviter (1-2 cm.) abrupte angusteque acuminatae basi leviter (ad 1 cm.) cordatae ciliatae et insigniter crenulatae, supra sparse vel modice setosae pilis laxis gracilibus p. p. glanduliferis et in nervis primariis modice cum pilis plumosis obsitae, subtus in nervis primariis dense gracili-setosae et modice cum pilis plumosis brevibus obsitae in nervulis sparse setulosae, supra et subtus sparse resinoso-glandulosae, 5-7-nervatae nervis supra planis vel leviter impressis subtus creberrime elevatis nervis tertiariis laxe irregulariterque reticulatis. Inflorescentia ramulosa 2-4 cm. longa (in fructu ad 6 cm.); flores 4-meri 1-2 mm.-pedicellati; bracteolae 0.5-1 mm. longae ovatae stellato-furfuraceae et setiferae paulo infra hypanthium insertae. Hypanthium 4-4.5 X 1-1.3 mm. oblongum; calycis lobi interiores 0.5-1 mm. longi suborbiculares vel oblongi apice rotundati extus modice stellato-furfuracei intus sparse stellato-furfuracei vel glabri, dentibus exterioribus 1.5-2 mm. longis subulatis apice setiferis. Petala 2 X 1.5 mm. obovato-oblonga apice rotundata vel vix retusa glabra. Filamenta 2.5 mm. longa; antherae 2.5-2.8 mm. longae subulatae, connectivo simpliciter articulato. Stylus 6 mm. longus; stigma vix expansum truncatum; ovarium 4-loculare omnino inferum apice sparse glanduloso-setulosum.

Type Collection: *H. A. Allard* 21222 (holotype US 1999969), collected near cliffs at top of wooded ridge east of Tingo Maria, Dept. San Martin, Peru, elev. 850 m., Oct. 30-Feb. 19, 1950.

Paratypes: Peru, San Martin: east of Tingo Maria, Allard 21370 (US), Allard 22540 (US). Colombia: Com. Caquetá: Florencia, Cerro de La Sardina, alt. 500 m., J. Cuatrecasas 8914 (US); Tres Esquinas, Río Caquetá, alt. 200 m., M. Koele 5052 (US). Com. Putumayo: Puerto Ospina, Río Putumayo, alt. 230 m., Cuatrecasas 10569 (US); Mocoa, alt. 570-680 m., Cuatrecasas 11317 (US).

These three species may be separated as follows:

Inflorescence 2-4 cm. long, many-flowered; hypanthium densely covered with both simple setae and short plumose hairs.

Inflorescence 2 cm. long or less, few-flowered; hypanthium lacking plumose hairs. C. allardii

Lower leaf surface densely resinous-glandular, the veinlets finely and evenly reticulate; hypanthium without setae in lower 1/3. C. tococoidea

Lower leaf surface sparsely resinous-glandular, the veinlets laxly and irregularly reticulate; hypanthium basally densely setose. C. crenulata

The range of C. crenulata is the lowlands of El Valle and the Choco in Colombia and lowland Costa Rica (and probably lowland Panama); related middle-elevation collections from Costa Rica and Honduras are all C. elata Pittier. Maieta tococoidea var. Watsonii Cogn. is synonymous with C. crenulata.

C. tococoidea is restricted to the upper Río Negro and upper Orinoco drainages; the origin of the holotype (P) is doubtful, perhaps from Araracoara (Martius) or the upper Orinoco (Bonpland), but the Macbride photograph (36315) leaves no doubt as to the correctness of the present interpretation. I have not seen Poeppig 1794, from Maynas, Peru, cited by Cogniaux, but it probably is referable to C. allardii. The distinctions between C. tococoidea and C. crenulata are mostly quantitative, but on the basis of present collections permit absolute separation of the two species; perhaps future collections will show the desirability of treating the two taxa as subspecies.

The three Clidemia species treated by Gleason (Phytologia 3: 350-351) are closely related to the above complex. C. testiculata (Tr.) Gleas. sensu Gleason would be strictly limited to the Villavicencio area; however Cuatrecasas 9042 (US) from Sucre in Caquetá agrees in pubescence and inflorescence details with Villavicencio collections except for the cymes branching from the base. Another evaluation of this complex is necessary, desirably with field observations on petiole, formicaria, and inflorescence variability. C. allardii is distinguishable from both C. testiculata and C. elata by the long cauline hairs averaging 4-5 mm. long (rather than about 2 mm.) and the dense coating of plumose hairs on the stem and hypanthium. C. ciliata D. Don sensu stricto shares with C. allardii the character of

plumose hairs, but has sessile leaves, sparse cauline setae restricted to the young stems, and non-setose hypanthia with setae restricted to the calyx teeth. C. pilosa D. Don was synonymized with C. ciliata by Gleason; in this ecad (Killip & Smith 22706 agrees very well with the type photograph, Macbride 17227), the petioles are no longer than 2.5 cm., there are no formicaria, and the hypanthia are very sparsely setose. Additional material from Peru may indicate the necessity of reinstating C. pilosa in some rank, probably as a variety tending slightly toward C. allardii from C. ciliata.

CLIDEMIA OMBROPHILA Gleason

Hitherto recorded only from the original Darien (Panama) collection, this species has also been collected in Prov. Carthago, Costa Rica; vicinity of Orosi, Standley 39804 (US); El Muñeco on the Río Navarro, alt. 1400-1500 m., Standley & Torres 51052 (US), 51077 (US). One feature not noted in the original description is the tendency to dimorphism in leaf-pair size. From buds and a single open flower on the Costa Rican material, some additional floral details can be supplied: petals 2 X 1.7 mm., oblong-obovate, rounded-truncate; anthers 1 mm. long, oblong, truncate and minutely one-pored at the apex, the connective simple; ovary 4-celled, completely inferior, the apex slightly 8-ribbed.

CLIDEMIA BARKLEYI Wurdack, sp. nov.

C. gracili Pitt. affinis, sed cum foliis parvioribus basi distincte cordatis, laminis maioribus distincte 7-nervatis.

Frutex cum ramulis petiolis foliorum nervis primariis subtus modice arachnoideo-furfuraceis. Folia membranacea dispersilia 2-4 mm. petiolata; lamina 6-9 X 3-5.5 cm. vel 0.8-2.5 X 0.7-2 cm. ovata apice breviter acuteque acuminata basi 3-7 mm. -cordata margine integra et remote mucronulata distincte 7-nervata (maior) vel 5-nervata (minor) nervis tertiariis laxe reticulatis sed planis, supra et subtus primum arachnoideo-furfuracea demum nervis principalibus subtus exceptis glabrata. Inflorescentia ad 6 cm. longa pauciflora; alabastra solum cognita sed modo C. gracilis 4-mera cum hypanthio dense stellato-furfuraceo et petalis extus dense papillois.

Type Collection: William Johnson & Fred A. Barkley 18C490 (holotype US 2102596), collected "in selvas húmedas y densas entre Villa Arteaga y el Río Mutatá", Dept. Antioquia, Colombia, Mar. 20, 1948.

The larger of each leaf-pair in C. gracilis is oblong and rounded but not cordate at the base; the lower surface tertiary nerves are densely elevated-reticulate; and there are 3 (5, including the fainter marginals) primary nerves. To C. gracilis, Gleason referred Killip & Garcia 33613, from Int.

Choco, Colombia; while this Colombian collection does not show ancipital branches, it otherwise seems compatible with Panamanian material. In the treatment of the Panamanian species of *Clidemia* (Ann. Mo. Bot. Gard. 45: 247-256. 1958), *C. gracilis* should be keyed to near *C. purpureo-violacea* Cogn. and *C. ombrophila* Gleas., since the flowers are actually 4-merous; It is easily superficially separated from both its Panamanian relatives by the very short petioles and extreme foliar dimorphism.

CLIDEMIA SEMIJUGA (Gleas.) Wurdack, comb. nov.

Ossaea semijuga Gleason, Brittonia 2: 325. 1937.

Flowers in the Washington isotype verify the generic placement here proposed; hypanthium 2.5 mm. long; interior calyx teeth 0.8 mm. high, remote, slightly (0.2 mm.) exceeded by the acute external teeth; petals 1.5 X 1 mm., oblong and rounded, granulose; anthers 2.5 mm. long, narrowly oblong, the connective with a basal blunt dorsal appendage 0.2-0.3 mm. long.

C. semijuga vegetatively represents the ultimate in foliar dimorphism among its 4-merous relatives *C. dimorphica* Macbr., *C. gracilis* Pittier, *C. biolleyana* Cogn., and (probably) *C. barkleyi* Wurdack, sharing with them the general floral features, especially the dorsal stamen connective appendage.

HENRIETTELLA TOBAGENSIS Wurdack, sp. nov.

H. triflorae (Vahl) Tr. affinis, sed cum foliis supra bullato-strigulosis et subtus in venis primariis breviter strigulosis.

Rami teretes primum dense strigulosi demum glabrati. Petioli ca. 1 cm. longi; lamina rigidiuscula 10-20 X 2-5 cm. oblongo-elliptica apice longe (1.5-3.5 cm.) acuminata basi rotundata breviter 5-plinervata nervis duobus interioribus 7-15 mm. supra basim insertis nervis lateralibus ca. 5 mm. inter se distantibus supra obscuris subtus prominulis, supra subtiliter denseque bullato-strigulosa, subtus in venis venulisque dense strigulosa in superficie modice incurvo-setulosa, inconspicue rotundato-denticulata. Flores ignoti; fructi immaturi 4-meri 3-7-fasciculati; pedicelli 1.5-3 mm. longi cum hypanthio densissime longo-strigulosi setulis basi vix inflatis; hypanthium 4-5 mm. longum ad medium constrictum, lobis deltoides 1-1.2 mm. longis. Ovarium 4-loculare.

Type Collection: R. S. Cowan 1475 (holotype US 2287189), collected in primary forest on Main Ridge, Bloody Bay to road-head above Roxborough, Parlatuvier-Roxborough Trace, Tobago, alt. 550 m., Apr. 8, 1959. "Tree 4 m. tall. Fruits green. Infrequent".

H. triflora, known from St. Vincent, St. Lucia, and Grenada, has the upper leaf surfaces shortly loose-strigose and not at all bullate; the lower leaf surface primary veins are strigose

with incurved hairs about 2 mm. long. The relationship of the newly described species seems so obvious that the lack of flowering material has not been a handicap.

TOPOBEA CASTANEDAE Wurdack, nom. nov.

T. grandiflora Wurdack, Phytologia 6: 6. 1957, non T. grandiflora Suessenguth, Bot. Jahrb. 72: 278. 1942.

THE GENUS PARODIANTHUS

Harold N. Moldenke

This is the twentieth in my series of works of monographic nature on the genera of Verbenaceae. Previous genera so treated are Aegiphila Jacq., Amasonia L. f., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Petitia Jacq., Petrea Houst., Priva Adans., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Svensonia Moldenke, Tectona L. f., Vitex Tourn. and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 249 herbaria whose material was examined, in whole or in part, in the preparation of these works, will be found in Phytologia 5: 154--159 (1955), 6: 242 (1958), and 7: 91--92 & 123--124. 1960.

PARODIANTHUS Troncoso, Darwiniana 5: 37--39. 1941.

Literature: Moldenke, Phytologia 1: 97. 1934; Junell, Symb. Bot. Upsal. 4: 18. 1934; Moldenke in Fedde, Repert. 39: 47 (1935) and 39: 132, 138--139, 152, & 153. 1936; Hill, Ind. Kew. Suppl. 9: 54. 1938; Moldenke, Geogr. Distrib. Avicenn. 29. 1939; Moldenke, Prelim. Alph. List Invalid Names 14. 1940; Troncoso, Darwiniana 5: 31--40, fig. 1--3. 1941; Moldenke, Lilloa 6: 434 (1941) and 8: 428. 1942; Moldenke, Alph. List Invalid Names 12 & 44. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 97. 1942; Moldenke, Lilloa 10: 345. 1944; E. J. Salisb., Ind. Kew. Suppl. 10: 233. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 31 & 75. 1948; Moldenke, Alph. List Cit. 3: 694 & 903 (1949) and 4: 979 & 980. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 192. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 178 & 273. 1953; Moldenke, Résumé 126, 250, 354, 408, & 464. 1959.

Illustrations: Troncoso, Darwiniana 5: 33, 36, & 38, fig. 1--3. 1941.

Branched shrubs; leaves opposite or ternate; inflorescence reduced, axillary, racemiform, few-flowered; flowers medium in size, borne on a fleshy receptacle; pedicels bracteate; receptacle

slightly incrassate; calyx cylindric-tubular, membranaceous, gamosepalous, inferior, its tube 5-costate, the rim 5-dentate, the teeth subequal, subulate, the margins incurved; corolla hypocrateriform, gamopetalous, zygomorphic, inferior, its tube terete, the limb spreading, 5-fid, the lobes rounded, unequal; fertile stamens 4, didynamous, included, inserted above the middle of the corolla-tube; filaments short; anthers oblong, eglandular, subdorsifixed, composed of 2 thecae, the thecae parallel; staminode absent; pistil one, 2-carpellary; style single, slender, short, included; stigma terminal, shortly bilobed, the lobes unequal, the posterior one papillose and subpeltate, the anterior one small; ovary superior, ovate, 4-locular, the cells each 1-ovulate; ovules 4, subanatropous, pendulous, broadly and laterally affixed below the apex; fruit schizocarpous, the pericarp thick, subligulous; mericarps 2, hemispheric, 2-celled; seeds exalbuminous, ovate, the embryo straight; cotyledons 2, thick, fleshy, ovate; radicle basal, subconic, the plumule very small.

In my monograph of the genus Casselia Nees & Mart. [Timotocia Moldenke] in 1936 I included this species as a valid species. Since then, however, Nelida S. Troncoso has published a very thorough paper (1941), cited above, in which she presents very cogent arguments for its separation as a distinct genus. I agree with her findings wholeheartedly. Among the differences between the two genera which she lists are the following: in Casselia (1) the inflorescence is definitely racemose, the racemes 1--4-flowered, blooming successively, (2) the calyx is campanulate-obconic, in age venose-reticulate, the teeth triangular, (3) the corolla is infundibular, gradually ampliate apically, somewhat longer than the calyx, (4) the stamens are inserted in the lower half of the corolla-tube, the connectives of the lower ones greatly developed and thickened, (5) the anthers are dorsifixed at their upper half, (6) the ovary is 1-carpellary (the anterior carpel being aborted), 2-locular and 2-ovulate, (7) the ovules are 2 in number, attached laterally, bordering the carpel for a large part of its length, (8) the stigma is swollen, papillose, and oblique, (9) the fruit is drupaceous, composed of two 1-celled and 1-seeded pyrenes, with a thin endocarp, and (10) the distribution is in tropical areas of Brazil, Paraguay, and Bolivia.

On the other hand, in Parodianthus (1) the inflorescence is only problematically racemose, the racemes 2-flowered, and the blooming simultaneous, (2) the calyx is tubular and cylindric, in age 5-costate, the teeth subulate, with the margins rolled inwards, (3) the corolla is hypocrateriform, its tube equal in diameter throughout its length, scarcely surpassing the calyx, (4) the stamens are inserted in the upper half of the corolla-tube, the connective being normal, (5) the anthers are dorsifixed at their lower half, (6) the ovary is 2-carpellary (both carpels perfectly developed), 4-locular and 4-ovulate, (7) the ovules are 4 in number, pendent, attached subapically, (8) the stigma is swollen, 2-lobular, the anterior lobe subpeltate and papillose, the posterior one reduced, (9) the fruit is probably schizocarp-

ous, the 2 mericarps bilocular and 2-seeded, the pericarp thick, and (10) the distribution is in the hot dry region of eastern Argentina.

In view of the construction of the ovary and fruit, the genus appears to belong in the Subfamily Verbenoideae Briq., Tribe Citharexyleae Briq., along with the genera Coelocarpum Balf. f., Duranta L., Baillonia Bocq., Rehdera Moldenke, Citharexylum B. Juss., and Rhaphithamnus Miers, being closest related to the last three of these. However, Citharexylum differs in having a small tubular-campanulate calyx, cyathiform fruiting-calyx, with the teeth reduced, the corolla more nearly actinomorphic and smaller, the androecium consisting of either 5 fertile stamens and 4 fertile stamens and 1 sterile staminode, attached at the same level, the racemes multiflowered. Rhaphithamnus differs in having a small, truncate, decidedly urceolate calyx, with the teeth only slightly developed, the corolla infundibular, the tube elongated, 4 fertile stamens and 1 staminode, the filaments long, the anther-thecae divergent at the base, and the style exserted. Rehdera differs in having the corolla-lobes narrow and densely tomentose or pubescent, 4 fertile stamens and 1 staminode inserted beneath the corolla-mouth, the schizocarp with a winged margin, with a thin papery pericarp, and the racemes both axillary and terminal.

The genus is known only from the type species, Casselia ilicifolia Moldenke [= Parodianthus ilicifolius (Moldenke) Troncoso].

PARODIANTHUS ILICIFOLIUS (Moldenke) Troncoso, Darwiniana 5: 33, 36, & 39. 1941.

Synonymy: Casselia ilicifolia Moldenke, Phytologia 1: 97.

1934. Timotocia ilicifolia (Moldenke) Moldenke in Fedde, Repert. 39: 138--139. 1936.

Literature: see list above, under the genus as a whole.

Illustrations: see list above, under the genus as a whole.

Branching shrub; trunk and larger branches covered with a whitish-gray bark, easily exfoliated; branches slender, quadrangular or subtetragonal, 4-costate, glabrate; secondary branchlets and twigs slender, tetragonal, brownish or yellowish-brown, greenish when fresh, densely short-pubescent or puberulent, sometimes slightly hirsute, with glanduliferous hairs; principal internodes abbreviated, 0.7--3 cm. long; leaves sessile, decussate-opposite or ternate, with a small tuft of long rigid hairs covering the axillary bud at their insertion, the blades varying from oblong or elliptic to oval or ovate, 3--15 mm. long, 1.5--14 mm. wide, puberulent on both surfaces or short-pubescent with uniformly placed hairs, densely and irregularly spinose along the margins, the larger ones very much widened and truncate at the base, the smaller ones crowded on very short twigs and very narrow and acute at the base, the teeth 0.5--2 mm. long, the venation slender, barely visible; peduncles axillary, opposite or ternate, very slender, 2--4-flowered (mostly 2-flowered),

subtetragonal, 1—2 cm. long, densely puberulent or short-pubescent with both long and rigid hairs and with short glanduliferous ones, bracteate at the apex; bractlets one pair, linear or lanceolate, 0.3—6 mm. long, densely puberulent, inserted at the base of the pedicel; pedicels short, 1—5 mm. long; calyx tubular or cylindric, 6—10 mm. long, 2.5—3 mm. wide, more or less 5-costate with the prominent ribs forming distinct depressions between them and terminating in the teeth, densely puberulent or short-pubescent with abundant short hairs and sparse long glanduliferous ones intermixed, the teeth linear, 1—2 mm. long; corolla hypocrateriform, violet, zygomorphic, its tube cylindric, almost straight, slightly surpassing the calyx, 8—11 mm. long, glabrous externally, long-pilose with appressed hairs within near the mouth, the limb spreading, 5-lobed, the lobes unequal, rounded; stamens 4, didynamous, inserted near the base of the corolla-tube or above its middle, included; filaments very short; anthers oblong, eglandular, subdorsifixed, composed of 2 parallel thecae; staminode absent; pistil one, 2-carpellary; style single, slender, about 2.5 mm. long, glabrous, included; stigma terminal, shortly bilobed, the lobes unequal, the posterior one papillose and pel-tate or subpeltate, the anterior one small; ovary superior, ovate, about 1.3 mm. long, glabrous, 4-celled, the cells each 1-ovulate; ovules 4, subanatropous, pendulous, broadly and laterally affixed below the apex; fruit schizocarpous, the pericarp thick, corky on the outside and subligneous or osseous adjacent to the locules; mericarps 2, hemispheric, 2-celled, smooth on the surface, convex on the dorsal and flat on the commissural surface; seeds exalbuminous, ovate, the embryo straight; cotyledons 2, thick, fleshy, ovate; radicle basal, subconic, the plumule very small.

The type of this species was collected by Frederico Schmaedke at La Diana, Ulapes, La Rioja, Argentina, on February 24, 1907, and is T. Stuckert 17013, deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. In my original dissection I found the stamens inserted near the base of the corolla-tube and the ovary only 2-celled, and so described the species. Miss Troncoso claims, after more detailed dissection, that the stamens are actually inserted above the middle of the corolla tube and that the ovary is 4-celled. Stuckert 4727 was erroneously cited by me on page 139 of my Timotocia monograph and in my 1941 work as "4724". In all, 9 herbarium specimens, including the type, and 7 mounted photographs have been examined.

Citations: ARGENTINA: La Rioja: Hieronymus & Niederlein 139 (B, B); Schmaedke s.n. [Stuckert 17013; Macbride photos 28392] (Cb--type, E--photo of type, Kr--photo of type, N--isotype, N--isotype, N--photo of type, S--photo of type, W--photo of type, Z--photo of type); Stuckert 4727 (Cb), 4734 (Cb), 17014 (Cb), 22502 (Cb), s.n. (B--photo).

Miss Troncoso cites specimens of Stuckert 17013 from the Córdoba and Miguel Lillo herbaria, and 17014 from the Córdoba herbarium, not as yet seen by me.

BOOK REVIEWS

Harold N. Moldenke

"Aquatic Phycomycetes", by Frederick K. Sparrow, second revised edition [University of Michigan Studies, Scientific Series, volume 15]. 1--xxv & 1--1187 pages. 1960. \$22.50, University of Michigan, Ann Arbor, Michigan.

In this beautifully printed revised edition Dr. Sparrow discusses all the aquatic phycomycetous fungi in 10 botanical orders, 28 families, and 152 genera. He discusses 846 species and 32 varieties and forms, including both those regarded by him as valid and the imperfectly known ones, as well as 28 other imperfectly known putative species as yet unnamed. He gives technical diagnoses for 8 orders, 24 families, 152 genera, and 781 species, and relegates to synonymy at least 396 names.

There are 929 excellent line illustrations. Thirty new genera, species, and nomenclatural combinations are proposed. There are detailed discussions of the phylogeny and relationships, morphology, cytology, and physiology of each order. A bibliography of over 1200 entries is included, as well as a very valuable and highly interesting list of the substrata on which the various species have been reported -- including such diverse ones as algae, fungi, hepatics, mosses, pteridophytes, gymnosperms, angiosperms, various animal groups, and organic substances. Keys are provided to the orders, families, and most of the genera and species, with the exception of very recently published and imperfectly known ones.

This scholarly monograph should prove extremely useful and valuable to all workers on microscopic organisms and will remain a standard reference in the field for many years to come. Our congratulations to Dr. Sparrow and our thanks to the University of Michigan Press for making this book available!

"Maps of distribution of Norwegian vascular plants", edited by K. Faegri, O. Gjaerevoll, J. Lid, and R. Nordhagen, volume 1: Coast plants, by K. Faegri [Univ. Bergen Skrift. 26], 1--134 pages, 1--liv maps.

This imposing work includes sections on the topography, geology, and climate of Norway, and on the ecology of the coastal flora. A review is given of all previous works on the subject, with a bibliography of 351 titles. In all, 157 specific and sub-specific taxa are discussed in detail, with a distributional map given for each as it is known to occur in Norway. The first Norwegian record is given, doubtful and excluded stations are discussed, the altitudinal limits are given, as well as habitat.

NOTES ON BROMELIACEAE, XV

Lyman B. Smith

MEXICO

TILLANDSIA CONCOLOR L. B. Smith, sp. nov.

A *T. fasciculata* Sw., cui affinis, foliis omnino cinereis, vaginis haud vel basi angustissime castaneis, scapo brevissimo vaginis foliorum oblecto differt.

Stemless; leaves many in a dense funnellform rosette, 20-30 cm. long, almost always exceeding the inflorescence, covered with subappressed cinereous scales throughout or with a narrow castaneous collar at base, thick, evidently fleshy, irregularly and coarsely rugose on drying; blades narrowly triangular, filiform-acuminate, involute, barely distinguishable from the sheaths, to 17 mm. wide at base; scape very short, concealed by the leaf-bases; scape-bracts subfoliaceous but small and with thin yellow glabrous bases; inflorescence simple or digitately compound from 2-4 spikes; primary bracts like the scape-bracts, much smaller than the floral bracts; spikes linear-lanceolate, acute, 9-13 cm. long with a number of reduced sterile bracts at base, 2-3 cm. wide, strongly complanate, densely many-flowered; floral bracts ovate, acute, 35-40 mm. long, exceeding the sepals, carinate, thin-coriaceous, nerved, glabrous, drying red and yellow or green; flowers subsessile; sepals lanceolate, acute, 23-32 mm. long, connate posteriorly; petals linear, 6 cm. long, tubular-erect, violet; stamens exserted. Pl. I, fig. 1: Habit x 1/2; fig. 2: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,321,075, collected on trees, 16 kilometers north-northeast of Tehuantepec along the Pan-American highway (Routes 185 & 190), altitude 50 meters or less, July 7, 1959, by Robert Merrill King (No. 1385). Isotype (MICH).

MEXICO: Guerrero: El Tibor, alt. 100 m., August 23, 1898, Langlassé 297 (US). Oaxaca: Picacho to San Geronimo, July 1914, Purpus 7414 (US). On tree, La Ventosa, 7 km. east of Salina Cruz, alt. 0-50 m., July 3, 1959, King 1295 (MICH, US). About 4 km. north-northeast of Tehuantepec along Trans-Isthmian highway (Routes 185 & 190), alt. 0-50 m., July 5, 1959, King 1336 (MICH, US). Beach of Laguna Superior, south of Juchitán, near village of Xandani, alt. 0-10 m., July 11, 1959, King 1556 (MICH, US). Chiapas: Cliffs and rocky gorge above Rancho San Luis about 2 miles north (Roblada), alt. 825 m., March 23, 1949, Carlson 1546 (F, US).

GREATER ANTILLES

HOHENBERGIA

Jamaica is the great center of Hohenbergia north of the equa-

tor and so it is not surprising that the ample collections of the Institute of Jamaica should enlarge and improve our knowledge of the genus. The following synopsis will serve to relate the new species proposed and also to place the old ones in a more natural order.

1. Floral bracts rounded or broadly acute. Jamaica.
2. Sepals exserted above the floral bracts; spikes glabrous.
3. Floral bracts strongly nerved, stramineous when dry.
 1. H. brittoniana
3. Floral bracts even or nearly so, dark castaneous when dry.
4. Leaf-blades serrate; micro of the floral bracts minute; sepals unarmed.....2. H. fawcettii
4. Leaf-blades entire or obscurely serrulate toward base; micro of the floral bracts to 4 mm. long; sepals mucronate.
 3. H. jamaicana
2. Sepals covered by the floral bracts; spikes brown-tomentose-lepidote.
5. Floral bracts even or nearly so.
6. Spikes stipitate.....4. H. eriostachya
6. Spikes sessile.
7. The spikes densely aggregated, at least toward the summit of the inflorescence.....5. H. polycephala
7. The spikes all remote.....6. H. gnetacea
5. Floral bracts strongly nerved.
8. Lowest stipes about as long as the spikes; floral bracts not over 13 mm. long.....7. H. inermis
8. Lowest stipes much shorter than the spikes; floral bracts 20 mm. long.
9. Wing of the posterior sepals broadly rounded at apex; floral bracts rounded.....8. H. urbaniana
9. Wing of the posterior sepals acuminate; floral bracts broadly acute.....9. H. proctori
1. Floral bracts acuminate.
10. Leaf-blades acuminate. Porto Rico.....10. H. attenuata
10. Leaf-blades broadly rounded and apiculate.
11. Floral bracts 25 mm. long. Porto Rico.....11. H. antillana
11. Floral bracts not over 15 mm. long.
12. Scape-bracts shorter than the internodes; spikes subglobose. Porto Rico.....12. H. portoricensis
12. Scape-bracts longer than the internodes.
13. Lower spikes shorter than their stipes. Jamaica.
14. Primary bracts much shorter than the stipes; apical spikes distinctly stipitate; lower floral bracts narrow.....13. H. distans
14. Primary bracts about equaling or exceeding the lower stipes; apical spikes sessile or subsessile.
15. Branches of the inflorescence stiffly spreading, longer than the primary bracts; scape-bracts barely exceeding the internodes.....14. H. abbreviata
15. Branches of the inflorescence reflexed; shorter than the lower primary bracts; scape-bracts to 4 times

the internodes.....15. H. laesslei

13. Lower spikes equaling or longer than their stipes.
 16. Mucro nearly or quite as long as the base of the sepal.
 17. Spikes subsessile, erect; inflorescence very dense
 except sometimes the extreme base. Jamaica.
 16. H. spinulosa
 17. Spikes distinctly stipitate and somewhat spreading;
 inflorescence rather lax. Grand Cayman.
 17. H. caymanensis
 16. Mucro much shorter than the base of the sepal.
 18. Spikes subglobose or broadly ellipsoid, short; lower
 primary bracts not much exceeding the branches.
 Cuba, Jamaica.....18. H. penduliflora
 18. Spikes cylindric, to 6 cm. long; lower primary bracts 3
 times as long as the branches. Jamaica.
 19. H. negrilensis

1. HOHENBERGIA BRITTONIANA L. B. Smith, Contr. Gray Herb. 98:8, pl. 1, figs. 12-14. 1932; No. Am. Fl. 19:223. 1938.
JAMAICA: Without further locality.

2. HOHENBERGIA FAWCETTII Mez, Symb. Ant. 2:254. 1900; No. Am. Fl.
19:223. 1938.
JAMAICA: Blue Mountains.

3. HOHENBERGIA JAMAICANA L. B. Smith & G. R. Proctor, sp. nov.
A H. fawcettii Mez, cui affinis, laminis foliorum inermibus
vel ad basin versus obscure serrulatis, bracteis florigeris
longiore mucronatis, sepalis armatis differt.

Flowering over 12 dm. high; leaves incompletely known, minutely and inconspicuously appressed-lepidote throughout; sheaths broadly elliptic but only a little wider than the blades; blades ligulate, broadly rounded and apiculate, 7-12 cm. wide, entire or sparsely and obscurely serrulate toward base; scape stout, glabrous; scape-bracts large and evidently imbricate but soon deciduous; inflorescence laxly bipinnate or the lowest branches with 2 sessile spikes, glabrous; primary bracts lanceolate, thin, about equaling the lower branches; stipes to 35 mm. long; spikes cylindric, 5-8 cm. long; floral bracts broadly ovate, much exceeded by the sepals, bearing a mucro to 4 mm. long, even or nearly so, dark castaneous when dry; posterior sepals elliptic, strongly asymmetric with a lateral wing equaling the terminal mucro, 5 mm. long. Pl. I, fig. 3: Branch x 1/2; fig. 4: Sepal x 1.

Type in the Institute of Jamaica, No. 3463, collected on tree, 1 1/2 miles north of Catadupa, St. James Parish, Jamaica, altitude ca. 375 meters (1250 feet), April 5, 1952, by George R. Proctor (No. 6543).

Paratype: JAMAICA: St. James Parish: On roadside tree, Mt. Carey District, 1 mile south of Anchovy, alt. 195 m. (650 ft.), July 7, 1957, G. R. Proctor 16452 (IJ).

4. HOHENBERGIA ERIOSTACHYA Mez, Symb. Ant. 2:255. 1900; No. Am.

fl. 19:221. 1938.

JAMAICA: Eastern.

5. HOHENBERGIA POLYCEPHALA (Baker) Mez in DC. Monogr. Phan. 9: 133. 1896; No. Am. Fl. 19:221. 1938.

Aechmea polycephala Baker, Journ. Bot. 17:164. 1879.

JAMAICA: Widespread.

6. HOHENBERGIA GNETACEA Mez in Mart. Fl. Bras. 3, pt. 3:272, pl. 60, fig. 1. 1891; No. Am. Fl. 19:221. 1938.

JAMAICA: Without further locality.

Note: This may be only an aberrant specimen of H. polycephala.

7. HOHENBERGIA INERMIS Mez, Repert. Sp. Nov. Fedde 12:414. 1913; No. Am. Fl. 19:222. 1938.

JAMAICA: Western interior.

8. HOHENBERGIA URBANIANA Mez, Symb. Ant. 2:253. 1900; No. Am. Fl. 19:222. 1938.

JAMAICA: Central, especially Rio Minho upper valley.

9. HOHENBERGIA PROCTORI L. B. Smith, sp. nov.

A H. urbaniana Mez, cui valde affinis, bracteis florigeris acutis, sepalis posterioribus acuminatis differt.

Forming massive clumps (! Proctor); leaves rosulate, to 7 dm. long, minutely and inconspicuously appressed-lepidote throughout, concolorous; sheaths broadly elliptic but only a little wider than the blades; blades ligulate, broadly rounded and apiculate, 8-9 cm. wide, entire or sparsely serrulate toward base; scape stout, white-flocculose, becoming glabrous with age; scape-bracts erect, lanceolate, about twice as long as the internodes; inflorescence bipinnate, lax except at apex, 20-26 cm. long, glabrous at least with age; primary bracts like the scape-bracts, shorter than the branches; stipes stout, flattened, the lowest 1-2 cm. long; spikes ellipsoid to cylindric, 6-12 cm. long, 20-25 mm. in diameter; floral bracts broadly ovate, broadly acute with a mucro 2 mm. long, to 2 cm. long, exceeding the sepals, strongly nerved, stramineous when dry; posterior sepals triangular with an acuminate inconspicuous wing, 12 mm. long including the 1-2 mm. mucro, short-connate; ovary compressed, alate continuous with the keels of the posterior sepals. Pl. I, fig. 5: Branch x 1/2; fig. 6: Sepal x 1.

Type in the U. S. National Herbarium, No. 1,959,950, collected on tree, 1 mile north of Four Paths, along road to Ginger Hill, St. Elizabeth Parish, Jamaica, altitude ca. 225 meters (750 feet), April 6, 1952, by George R. Proctor (No. 6567). Isotype in the Institute of Jamaica.

Paratypes: JAMAICA: St. Elizabeth Parish: On tree, 1 mile south of Accompong, alt. 360 m. (1200 ft.), May 22, 1953, H. Anderson s. n. (IJ). Westmoreland Parish: On trunks of large trees, Lenox District, 1 mile north of Hopeton, alt. ca. 360 m. (1200 ft.), March 9, 1956, G. R. Proctor 11716 (IJ).

10. HOHENBERGIA ATTENUATA Britton in Britton & Wilson, Sci. Surv. Porto Rico 5:134. 1923; No. Am. Fl. 19:224. 1938.
PORTO RICO: Eastern, region of Sierra de Naguabo.
11. HOHENBERGIA ANTILLANA Mez in DC. Monogr. Phan. 9:137. 1896; No. Am. Fl. 19:224. 1938.
PORTO RICO: Widespread.
12. HOHENBERGIA PORTORICENSIS Mez in DC. Monogr. Phan. 9:136. 1896; No. Am. Fl. 19:225. 1938.
PORTO RICO: Eastern, region of Sierra de Naguabo.
13. HOHENBERGIA DISTANS (Griseb.) Baker, Saund. Refug. Bot. 4: sub pl. 284. 1871; No. Am. Fl. 19:224. 1938.
Aechmea distans Griseb. Fl. Brit. W. Ind. 592. 1864.
JAMAICA: Dolphin Head, Hanover Parish.

14. HOHENBERGIA ABBREVIATA L. B. Smith & G. R. Proctor, sp. nov.
H. distantis (Griseb.) Baker atque H. laesslei L. B. Smith affinis, a priore bracteis primariis bases steriles ramorum infimorum subaequantibus, spicis supremis subsessilibus, a posteriore scapi bracteis vix imbricatis, inflorescentiae ramis patentibus bracteas primarias superantibus distinguenda.

Flowering 12-13 dm. high; leaves to 7 dm. long, covered throughout with small pale appressed inconspicuous scales; sheaths broadly elliptic, distinctly wider than the blades, brown-tinged; blades ligulate, broadly rounded and apiculate, 7-11 cm. wide, laxly but regularly serrulate; scape slender, white-flocculose, becoming glabrous with age; scape-bracts erect, lanceolate, barely exceeding the internodes; inflorescence laxly bipinnate with the upper spikes short-stipitate, 43-47 cm. long, glabrous; primary bracts linear, acuminate, shorter than the lowest branches but about equaling their sterile bases; stipes slender, flattened, to 7 cm. long; spikes ellipsoid to subglobose, 15-25 mm. long; floral bracts broadly ovate, acuminate to a small slender mucro, 5 mm. long, much exceeded by the sepals, thin, nerved, stramineous when dry; sepals strongly asymmetric with a produced lateral wing equaling or exceeding the terminal mucro, 5 mm. long, short-connate; petals white, bearing 2 highly adnate infundibuliform appendages. Pl. I, fig. 7: Branch x 1/2; fig. 8: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,113,121, collected on rocks, wooded limestone hill, vicinity of Ramgoat Cave, Cockpit Country, Trelawny Parish, Jamaica, altitude ca. 450 meters (1500 feet), October 22, 1955, by George R. Proctor (No. 11048). Isotype in the Institute of Jamaica.

Paratypes: JAMAICA: Trelawny Parish: On shaded limestone rocks, vicinity of Ramgoat Cave, alt. ca. 450 m. (1500 ft.), July 4, 1955, Howard & Proctor 14435 (IJ). St. Ann Parish: On limestone ledges of steep wooded hillside, 1 1/2 miles due south of Gibraltar P. O., alt. 600 m. (2000 ft.), July 14, 1956, G. R. Proctor 15522 (IJ).

15. *HOHENBERGIA LAESSLEI* L. B. Smith, Bromel. Soc. Bull. 6:52, fig. 1956.
JAMAICA: Western Cockpit Country, St. James Parish.
16. *HOHENBERGIA SPINULOSA* Mez, Symb. Ant. 2:253. 1900; No. Am. Fl. 19:225. 1938.
JAMAICA: Hills of Manchester and St. Elizabeth Parishes.
17. *HOHENBERGIA CAYMANENSIS* Britton ex L. B. Smith, Proc. Am. Acad. 70:150, pl. 1, figs. 5, 6. 1935; No. Am. Fl. 19:226. 1938.
GRAND CAYMAN.
18. *HOHENBERGIA PENDULIFLORA* (A. Rich.) Mez in DC. Monogr. Phan. 9:135. 1896; No. Am. Fl. 19:225. 1938.
Pitcairnia penduliflora A. Rich. in Sagra Hist. Cuba 11:262. 1850.
CUBA: Widespread. JAMAICA: Northern and eastern.
19. *HOHENBERGIA NEGRILENSIS* Britton ex L. B. Smith, Proc. Am. Acad. 70:151, pl. 1, figs. 7, 8. 1935; No. Am. Fl. 19:221. 1938.
JAMAICA: Southwestern.

NORTHWESTERN SOUTH AMERICA

- PITCAIRNIA BRONGNIARTIANA* André, Enum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888.
Pitcairnia klabochiana E. Morr. ex Mez in DC. Monogr. Phan. 9: 414. 1896.
COLOMBIA: Nariño: On rocks by Río Cuaiqueres, May 1876, André 3394 (K, type, GH photo 2576).
"ECUADOR": 1879, Klaboch (LG, type of *Pitcairnia klabochiana* E. Morr. ex Mez, GH photo).

- TILLANDSIA TOVARENSIS* Mez in DC. Monogr. Phan. 9:769. 1896.
Tillandsia spiculosa Griseb. Nachr. Ges. Wiss. Goett. for 1864 17. 1865. In part, not as to type.
Tillandsia arnoldiana Harms, Notizblatt 10:579. 1929.
VENEZUELA: Aragua: Between Petaquira and Colonia Tovar, alt. 2300 m., 1857, Fendler 2446 (GOET, type; US phot. 5564, 5565).
COLOMBIA: Magdalena: Sclerophyllous woods, "El Mamon," Sierra Nevada de Santa Marta, alt. 2200 m., February 1928, A. Schultze 1133 (B, type of *Tillandsia arnoldiana* Harms; F, phot. 11478).
Also found in ECUADOR and PERU.

BRAZIL

- PITCAIRNIA LIMAE* L. B. Smith, sp. nov.
A *P. pectinata* L. B. Smith, cui verisimiliter affinis, scapi bracteis omnibus internodia superantibus, spinis brevibus latis-que praeditis, sepalis oblongis rotundato-apiculatis differt.

Flowering plant over 65 cm. high; leaves of the rosette unknown, those at the base of the scape up to 22 cm. long, linear-lanceolate, acuminate, 14 mm. wide, entire, glabrous above, densely pale-lepidote beneath, involute-subulate toward apex; scape erect, 5-8 mm. in diameter, soon glabrous; scape-bracts erect, exceeding the internodes but the upper ones narrow and revealing most of the scape, lanceolate, acuminate, serrulate; inflorescence simple, racemose, subulax, secund-flowered toward base, 21 cm. long, nearly glabrous; floral bracts narrowly lance-triangular, to 25 mm. long, exceeding the pedicels, the lowest serrulate; pedicels slender, 8 mm. long; flowers divergent to spreading, red; sepals oblong, rounded and apiculate, 21 mm. long; petals 55 mm. long, naked; ovary about half superior; ovules alate. Pl. I, fig. 9: Lowest flower x 1/2; fig. 10: Sepal x 1.

Type in the Instituto de Pesquisas Agronômicas, Recife, No. 8580, collected on the crest of the Serra de Maranguape, State of Ceará, Brazil, altitude ca. 1050 meters, November 23, 1955, by Dárdano de A. Lima (No. 55-2353).

VRIESEA CEARENSIS L. B. Smith, sp. nov.

V. longiscapa Ule in systema mea (Bromeliaceae of Brazil, pp. 102, 120) proxima sed foliis utrinque cretaceis, spicis pluribus paucifloris, bracteis floribusque subduplo minoribus differt.

Evidently stemless, flowering over 6 dm. high; leaves to 31 cm. long, concolorous, covered on both sides with appressed cretaceous brown-centered scales; sheaths elliptic, ca. 8 cm. long; blades ligulate, broadly rounded and apiculate, 4 cm. wide, flat; scape erect, 7 mm. in diameter at base; scape-bracts erect, imbricate, the lowest foliaceous, the highest elliptic, broadly acute and apiculate; inflorescence laxly compound from 5 spikes, 20 cm. long, obscurely punctulate-lepidote; primary bracts like the upper scape-bracts, covering the prophyllate bases of the lateral spikes, suberect; lateral spikes subspreading, subdensely 6-7-flowered, the fertile part 4 cm. long, terminal spike erect on the end of a scape-like peduncle with several imbricate bracts, 11-flowered; rhachis stout, geniculate, angled; floral bracts spreading and becoming secund with the flowers, broadly ovate, obtuse, to 10 mm. long, slightly more than twice the internodes, about half as long as the sepals, ecarinate, thin-coriaceous, pale brown when dry; flowers spreading, short-pedicellate; sepals elliptic, rounded, 17 mm. long, coriaceous, even or faintly nerved; petals ca. 22 mm. long, bearing 2 large lanceolate acuminate scales at base; stamens included, filaments somewhat thickened apically. Pl. I, fig. 11: Lateral branch x 1/2; fig. 12: Sepal x 1.

Type in the Instituto de Pesquisas Agronômicas, Recife, No. 8612, collected on tree, Serra de Maranguape, State of Ceará, Brazil, November 24, 1955, by Dárdano de A. Lima (No. 55-2385).

ORTHOPHYTUM DISJUNCTUM L. B. Smith var. MINOR L. B. Smith, var. nov.

A var. disjuncto omnibus partibus valde minoribus differt.
Flowering 15 cm. high; sepals 9 mm. long.

Type in the Instituto de Pesquisas Agronômicas, Recife, No. 1794, collected on granitic outcrop of mountain, Uzina Agua Branca, Fazenda Pelada, Município of Quipapa, State of Pernambuco, Brazil, July 12, 1950, by Dárdano de A. Lima (No. 50-592).

Aechmea subgenus ORTGIESIA (Regel) Mez in Mart. Fl. Bras. 3, pt. 3:308. 1892.

Ortgiesia Regel, Gartenflora 16:193, pl. 547. 1867. Type: O. tillandsioides Regel.

Aechmea subgenus Hoplophytum Mez in Mart. Fl. Bras. 3, pt. 3:306. 1892. As to description, not as to Hoplophytum Beer.

In distinguishing the subgenus Hoplophytum in Aechmea, Mez ostensibly based it on Beer's genus of the same name: "Subgenus HOPLOPHYTUM Beer (Gen.)." However, he placed the type of Beer's Hoplophytum (Billbergia rhodo-cyanea Lem. or Aechmea fasciata (Lindl.) Baker) in his subgenus Ortgiesia. The only species included in both Beer's genus Hoplophytum and Mez's subgenus Hoplophytum is H. purpureo-roseum Beer with its synonym H. suaveolens Beer, and this species does not fit Mez's definition. Its sepals are very short-connate with a relatively small mucro and by his own treatment they should place the species in the subgenus Aechmea (his Euaechmea).

Although he gave no explanation, Mez evidently was following E. Morren and typified his subgenus Hoplophytum on Aechmea coelestis (C. Koch) E. Morr. In any event, Mez's concept of the subgenus is left without a name and it does not seem worthwhile to provide one, as his distinctions prove much too feeble especially in the light of recent collections. Except for Aechmea purpurea-rosea, all the species in his Hoplophytum should be included in subgenus Ortgiesia on the basis of their high-connate long-mucronate sepals. On the other hand only the type remains of the species which he placed originally in Ortgiesia.

ARGENTINA

DYCKIA FLORIBUNDA Griseb. Symb. Argent. in Goett. Abh. 24:331. 1879.

Dyckia gilliesii Baker, Handb. Bromel. 136. 1889.

ARGENTINA: Córdoba: Sierra Chica, Quebrada de Colanchanga, derca del Cerro Pan de Azúcar, December 1875, Hieronymus 566 (GOET, type); same, November 10, 1877, Hieronymus s. n. (B, F phot. 11433; US). Las Achiras, Gillies s. n. (K, type of Dyckia gilliesii Baker; phot. GH).

Plate I

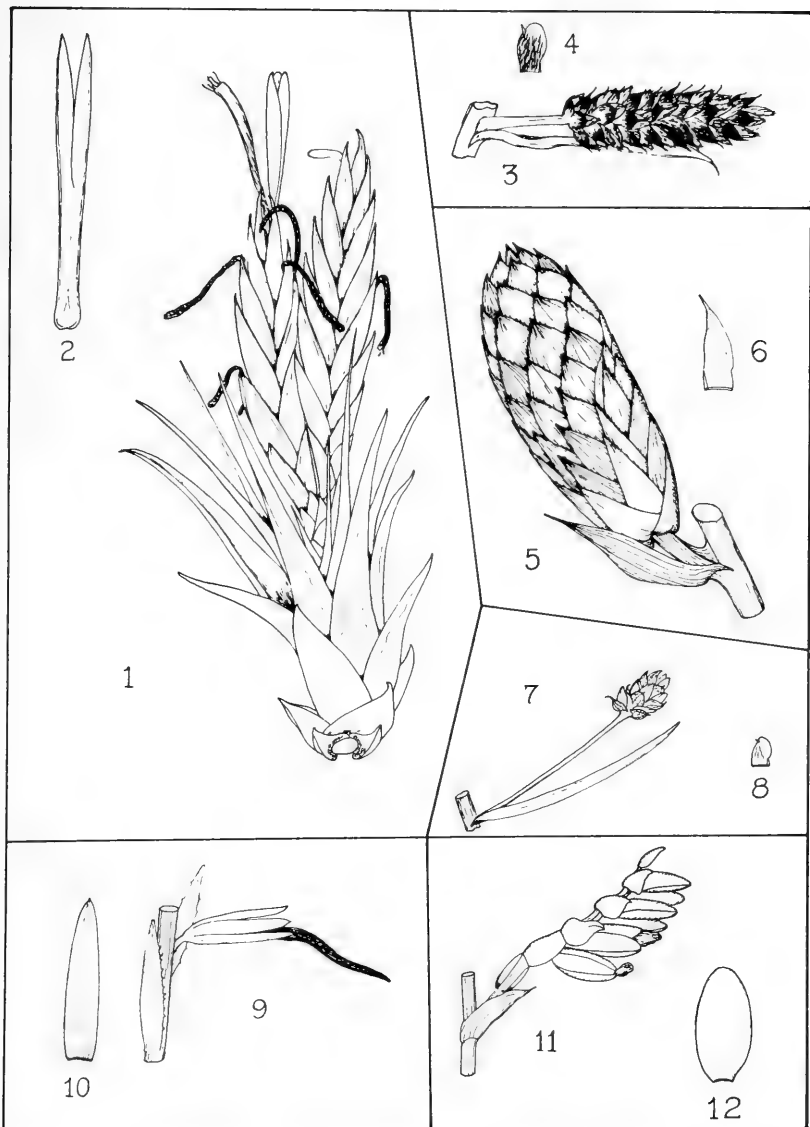


Fig. 1, 2: *Tillandsia concolor*; fig. 3, 4: *Hohenbergia jamaicana*;
 fig. 5, 6: *H. proctori*; fig. 7, 8: *H. abbreviata*; fig. 9-10:
Pitcairnia lima; fig. 11, 12: *Vriesea cearensis*.

NOTES ON NEW AND NOTEWORTHY PLANTS. XXVI

Harold N. Moldenke

JUNELLIA SPEGAZZINII Moldenke, nom. nov.

Verbena nubigena Speg., Comm. Mus. Buenos Aires 1: 137. 1898
[not *V. nubigena* Poepp. in Froriep, Notiz. Gebiet Natur- und
Heilk., ser. 1, 23: 292. 1829].

STACHYTARPHETA FIEBRIGI Moldenke, sp. nov.

Fruticulosa; ramis acute tetragonis glabris nitidis vel marginibus substrigosis; nodis plerumque annulatis albo-ciliatis; foliis sessilibus utrinque glabris oblongis integris, ad apicem acutis, ad basin rotundatis; inflorescentiis terminalibus solitariis simplicibus glabris; bracteis ovato-lanceolatis attenuato-aristatis.

Subshrub; stems and branches slender, sharply tetragonal, obscurely appressed-white-pilose or substrigose with antrorse hairs on the conspicuous margins or completely glabrous and shiny, stramineous, the sides usually very flat; nodes usually annulate and marked with a ring of erect or ascending whitish hairs, especially at the leaf-base; principal internodes 5--10 mm. long toward the base of the stems, elongate to 6 cm. beneath the inflorescences; leaves decussate-opposite, numerous, completely sessile, the blades chartaceous, rather uniformly green and shiny on both surfaces or slightly lighter beneath, oblong when mature, sometimes slightly elliptic when very young, 4--6.5 cm. long, 8--12 mm. wide, somewhat attenuate to an acute apex, entire, rounded at the base when mature (sometimes attenuate-acute when very young), mostly completely glabrous on both surfaces; inflorescence terminal, spicate, solitary, simple, 18--25 cm. long, very narrow, densely many-flowered in imbricate fashion, practically glabrous throughout; rachis slender, shallowly excavated under each flower; bracts ovate-lanceolate, about 7 mm. long, 2 mm. wide at the base, gradually attenuate to the sharply acute or aristate apex, humped at the base, somewhat scarious-margined above the base, shorter than the mature calyx, equaling or surpassing the immature ones; calyx tubular, 10--11 mm. long when mature, glabrous, the rim unequally 5-dentate with twisted aristate teeth; corolla dark-blue, hypocrateriform, the tube apparently about 10 mm. long and the limb 10 mm. wide.

The type of this very distinct species was collected by Karl Fiebrig (no. 4001) -- in whose honor it is named -- on a stony sparsely wooded hill at Centurion, between the Río Apa and the Río Aquidaban, in northern Paraguay, in October, 1908, and is deposited in the herbarium of the British Museum (Natural History) in London.

VERBENA PERUVIANA f. *ALBA* Moldenke, Résumé 110 & 473, nom. nud.

1959; f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by my good friend, Raulino Reitz (no. C.1280) in the state of Santa Catarina, Brazil, and is deposited in the Britton Herbarium at the New York Botanical Garden.

VERBENA TENUISECTA var. GLABRATA Moldenke, Résumé 111, nom. nud. 1959; var. nov.

Haec varietas a forma typica speciei laminis foliorum subglab-ratis et calicibus sparsissime strigillosis recedit.

This variety differs from the typical form of the species in having its leaf-blades subglabrate and the calyx very sparsely strigillose.

The type of the variety was collected by Raulino Reitz (no. C.1280e) at 10 meters altitude in the state of Santa Catarina, Brazil, flowering in October, and is deposited in the Britton Herbarium at the New York Botanical Garden.

VERBENA URTICIFOLIA var. INCARNATA (Raf.) Moldenke, comb. nov.
Verbena incarnata Raf., Atl. Journ. 154. 1832.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS AVICENNIA. III

Harold N. Moldenke

AVICENNIA MARINA var. RESINIFERA (Forst.) Bakh.

Miss Moore says that it can be safely assumed that the collections which give no further collection locality than "New Zealand" on their labels actually came from North Island since Avicennia does not extend south of 38°, which is about the center of North Island. Cheeseman, in the reference cited above, says that it occurs in "Muddy creeks and estuaries from the North Cape [of North Island] to Opotiki on the East coast and Kawhia on the west." Cockayne, in his "The distribution of the vegetation and flora of New Zealand", page 14, affirms that this is one of the 56 species, of which 45 are common or fairly common plants, which are stopped by the 38° S. phytogeographic barrier. In his "New Zealand plants and their story", edition 2, page 35 (1919) he says "in imagination, sail up one of the tidal rivers of these wide estuaries in the west of the North Auckland Botanical District — Hokianga or Kaipara Harbour -- or one of the tidal rivers of the east — the Whangarei for instance. If it is high tide, we shall see on either side of the stream a belt of close-growing, dull-coloured, small trees, rising out of the turbid water. These

consist of the mangrove, and the sight is one almost unknown in any other land outside the tropics. It is, in fact, one of the natural wonders of New Zealand."

L. M. Cranwell, in a newspaper article for children entitled "Mangrove or manawa, Prince of No-man's-land", says "It is a tropical wanderer, common, they say, from the Red Sea to the eastern coast of Australia, so that it is one of the wonders of plant life to see it so happy here in our colder estuaries. Spread by its bouyant fruits, it washes hither and thither, but it will not grow further south than Kawhia and Opotiki. Frosty winters and sandy shores even then make life too difficult for it on many shores north of these two points. It is small enough in the Auckland Harbour, but it is a mere pigmy at Opotiki. If you wish to see really fine groves you should go north, say to the Bay of Islands. There, every snake-like river, twisting lazily to sea between the low blue hills, is hemmed in and glorified by manawa. The gnarled grey limbs are tall and sturdy, lifting their bronze foliage 30 ft. or so above the shadowed mud, crammed fill of brittle roots and the soggy home of the little crabs."

In all, 303 herbarium specimens, including the types of all the names involved, and 8 mounted photographs and illustrations have been examined.

Citations: SUMATRA: Lörzing 9292 (Bz--16944). JAVA: Bakhuizen van den Brink 1191 (Bz--16872); Leeuwen-Reijnvaan s.n. [6 November 1910] (Bz--16889); Leschenault 213 (P). CELEBES: Barclay s.n. (Cl); Teijsmann 13791 (Bz--17075, Bz--17076, Le). LESSER SUNDA ISLANDS: Billiton: Teijsmann s.n. [Blitoeng] (Bz--16957). Timor: Bemmel 9 [Boschproefst. BB.6945] (Bz--17057, Bz--17058); Collector undesignated s.n. [Timor] (B, P); Gaudichaud 102 (B, P), s.n. (P); Herb. Mus. Paris s.n. (Le); Riédle s.n. (P, P). Wetar: Bloembergen 181 [Boschproefst. BB.27297] (Bz--16839). MOLUCCA ISLANDS: Taliaboe: Atjeh s.n. [Hulstijn 114] (Bz--17060, Bz--17061, Bz--17062). Island undetermined: Collector undesignated s.n. [Molucca] (Le, Le); Herb. Forster s.n. [Molucca] (Bm, Le, Le, Le). NEW GUINEA: Dutch New Guinea: Brandenhorst 227 (Bz--17066); Kanehira & Harusima 12889 (Bz--17063). Papua: Brass 882 (Bz--17065); Jaheri s.n. [Meranke, 15.IV.1901] (Bz--17070, Bz--17071, Le); J. W. R. Koch s.n. [Meranke] (Bz--17069); F. J. H. von Mueller 10 (Mb); L. S. Smith 1386 (Ng--6499). SOLOMON ISLANDS: Malaita: Kajewski 2344, in part (Bz--17077, Bz--17078, Bz--17079, S). Sohan: Rechinger & Rechinger 4927 (V, V), s.n. (V--photo). NEW CALEDONIA: Balansa 1337 (B, Bm, Br, Cb, Cb, Cb, Cl, Cp, Ed, K, La, N, X); Collector undesignated 182 (K); Compton 2 (Bm); Deplanche 343 (Dr, K), 1050 (Le, X), s.n. [Vieillard 1050] (K); Franc 2127 (Cb, K), s.n. [Bonati 2127] (Cb); Germaine s.n. [Nouméa] (B, K); Grunow s.n. [16/8/1884] (B), s.n. [Novbr. 1884] (V); Herb. Baillon s.n. (P); J. M. Hildebrandt 272 (V); Pancher s.n. [1870] (Le),

s.n. (Bm, K); Vieillard 1050 (Pa, V, V); C. T. White 2147 (B, Cp, K). AUSTRALIA: New South Wales: Banks & Solander s.n. [Bustard Bay, 1770] (Bm); F. L. Bauer s.n. [Port Jackson] (V); Beuzeville 426 (Gg--164263); Boorman s.n. [Fish River, 3-1918] (Ca--249350); R. Brown 2329, in part (Bm, Ed, Ed, K, K), s.n. [Port Jackson] (Ed); Caley s.n. [Sydney, 1804] (Us), s.n. [Sydney] (Bm), s.n. (Cb); D'Urville s.n. [Port Jackson, 1826] (Dc); Herb. Bot. Gard. Sydney s.n. [Manning River] (Gg--31940, Vu); J. D. Hooker 169 (K), 831 (K), s.n. [Sydney] (Cl); L. A. S. Johnson 24112 (N); Leichardt s.n. [Sidney] (B); Lesson s.n. [Port Jackson] (B); Maiden 796 (Ut); Meebold 3403 (Mu); C. Moore 61 (K); F. J. H. von Mueller s.n. [Botany Bay] (P, P); F. A. Rodway 298 (Gg--228405), 342 (Gg--226492), s.n. [Aug. 1928] (K); United States Expl. Exped. [Wilkes] s.n. [Sydney] (W--59280). Northern Territory: Bleeser 499 (B, B); R. Brown s.n. [North Coast] (K); Collector undesignated 46 (Vu); M. W. Holtze s.n. [Pt. Darwin; Herb. Prager 18689] (Gg--31941); Johnston & Setchell s.n. [Port Darwin, Feb. 5, 1927] (Ca--402919); Prager 46 (X); Rich. Schomburgk s.n. [N. Coast] (V, V). Queensland: F. M. Bailey 173 (E--118611), s.n. [Moreton Bay] (Du--9534); Carse s.n. [May 1921] (Cp); M. K. Clemens s.n. [Nugee, July 20, 1943] (Or--47770, Or--47771), s.n. [Sherwood, Aug. 10, 1943] (Or--49329, Or--49329); Dallachy s.n. [Rockhampton] (Bm); Dietrich 2354 (B, B, Cl), 2390 (Vu); Flecker 13878 (N); Herb. Bogor. 17081 (Bz); Michael 724, in part (Bz--17080); F. J. H. von Mueller s.n. [Endeavour River] (Cl), s.n. [Gladstone] (Cb, P), s.n. [northern part of York Peninsula] (Mu--1663, V), s.n. [Port Denison] (Br), s.n. [Rockhampton] (P, P), s.n. (B, Le, Ol, Os); Staer s.n. [Sept. 1911] (Ed); Thozet s.n. [1870] (P); Trist 3 (N); Verreaux 673 (P); Wilhelmi s.n. [Rockhampton] (B). South Australia: R. Brown s.n. [Inlet] (Bm), s.n. [South Coast, Inlet] (K), s.n. [South Coast islet] (Ed); Collector undesignated s.n. [Port Adelaide] (V); S. Helms 6 (Cp); Lea s.n. [Port Auputa] (Bm). Victoria: Adcock s.n. [Geelong] (Ed); F. W. Barnard s.n. [Gypsland] (Ed); French s.n. [Western Port] (Bm); Gunn s.n. [Port Philipp] (K, K); Meebold 7304 (Mu); F. J. H. von Mueller s.n. [Wilson's Promontory] (K). Western Australia: Collie s.n. [Cape Naturaliste] (K); DeVriese s.n. [Maduram] (Le); Diels 2741 (B), 3643 (B, B); T. Drummond 223 (Bm, Ed, Lu, P, P, V, X), 225 (Cb), s.n. [Sw. Riv.] (K); Milne s.n. [Shark Bay] (Bm, K, N); A. Morrison s.n. [Mouth of Ashburton River, 15/10/05] (Ed); Ostenfeld 1148 (Cp), 1167 (Cp); Preiss 916 (Cb), 1298 [512; Leschenault Bein] (Ut), 1298 [Swan River] (Dc--859, Le, P, V); Staer s.n. [Aug. 1905] (Ed). State undetermined: Banks & Solander s.n. [1770] (B, Bm, P, V); Baudin s.n. [1801] (P); R. Brown s.n. (B,

N); Collector undesigned s.n. [Mus. de Paris, 1821] (Dc), s.n. [Nouw Holland] (Le, P), s.n. [Port Telfair] (P); D'Urville s.n. [Nova Hollandia] (B); Gunn 14 (K); Herb. Hooker 207 (K); A. Richard s.n. (P); Sieber, Fl. Nov. Holl. 268 (B, B, B, B, B, Bm, Br, C, Cb, Cb, Cp, Dc, K, Le, Le, Mu--1073, Mu--1074, S, V, V, V, V, X); Verreaux s.n. (P, P). LOW ISLAND: Henne & Wilhelmi s.n. (B, B); Oldfield s.n. (K). PHILIP ISLAND: F. W. Barnard s.n. [Philip Isl.] (Ed). SANDY ISLAND: Collector undesigned s.n. (V); Cuming s.n. [1859] (Cb). BAY ISLANDS: S. Berggren s.n. [Oct. 1874] (X). MONTEBELLO ISLANDS: Campania 127 (Bm). HOUTMAN ROCKS: South Island: Gilbert 57 (Bm), s.n. (K). Island undesigned: Wickham & Stokes s.n. [H. M. S. Beagle, 1839--40] (Bm). PRINCE OF WALES ISLAND: R. Brown s.n. (Bm). NORTHUMBERLAND ISLAND: R. Brown 2329, in part (Bm). BRIBIE ISLAND: M. K. Clemens s.n. [Apr. 20-30, 1944] (Or--49587); C. T. White 916 (Bm). LORD HOWE ISLAND: Mallon s.n. (B). NEW ZEALAND: North Island: K. E. Adams 68986 (Z); Banks & Solander s.n. (Bm, W--1276429); Bennett s.n. (B); S. Berggren s.n. [Oct. 1874] (Lu, Us), s.n. [Taheke, Nov. 1874] (Lu, S); Brintnall s.n. [Fr. Thames River, 1914] (K); E. Cheesman s.n. [Auckland Harbor] (Cb), s.n. [1874] (Lu); Collector undesigned s.n. (F--362766, Vu, X); A. Cunningham 107 (K), 389 (K); Drake 23 (B); Forster 117 (Mu--1078), s.n. [Herb. Pallas] (Bm--isotype, N--photo of type, Th--type, Z--photo of type); Herb. Moricand s.n. (Cb); Hillebrand s.n. (B); J. D. Hooker s.n. [Nov. Zeland] (B, P); Hugel s.n. (V, V); Kirk s.n. [North Island] (E--118610, F--355703); Lesson s.n. (Dc, V); Lynd s.n. (Bm); Mackie s.n. [Hobson Bay, 28/11/31] (Ca--583290); Meebold 5233 (Mu, N, N--photo, Z--photo); L. B. Moore 19161 (Z); Myers 10907 (Bm); Petrie 74 (Na--10711); Philson 276 (H--56495); Raoul 118 (P), s.n. [1843] (Le), s.n. (B, Cb, Dc--933, K); A. Richard s.n. (P); Setchell & Setchell s.n. [Auckland Prov., Mar. 22, 1927] (Ca--313542); United States Expl. Exped. [Wilkes] s.n. (T). Rangototo Island: H. Powell s.n. [18.12.1949] (Ut--82434b); Sledge 103 (It). LOCALITY OF COLLECTION UNDESIGNED: Herb. Thibaud s.n. (Dc). MOUNTED ILLUSTRATIONS: Bauer, Icon. Nov. Holl. 961 (V), 961a (V), s.n. (V).

AVICENNIA MARINA var. RUMPHIANA (H. Hallier) Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 213--214, pl. 19. 1921.

Synonymy: Mangium album Rumph., Herb. Amboin. 3: 115--116, pl. 76. 1743. Avicennia nitida Blanco, Fl. Filip., ed. 1, 504. 1837 [not A. nitida Jacq., 1760, nor L. & Jacq., 1783, nor Rodsch., 1844, nor Sessé & Moc., 1894]. Avicennia tomentosa Blanco, Fl. Filip., ed. 2, 353. 1845 [not A. tomentosa Blume, 1918, nor R. Br., 1851, nor Jacq., 1760, nor L., 1826, nor L. & Jacq., 1783,

nor G. F. W. Mey., 1818, nor Nutt., 1947, nor Nutt. & Br., 1832, nor Roxb., 1835, nor Schau., 1940, nor Sieber, 1844, nor Sw., 1864, nor Vahl, 1921, nor Weigelt, 1851, nor Willd., 1822]. *Avicennia officinalis* Schau. ex Miq., Fl. Ind. Bat. 2: 912, in syn. 1856 [not *A. officinalis* L., 1753, nor H. J. Lam, 1940, nor Maxim., 1932, nor Millsp., 1930]. *Avicennia rumphiana* H. Hallier, Meded. Rijksherb. Leiden 37: 89. 1918. *Avicennia marina* var. *intermedia* Bakh. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940 [not *A. marina* var. *intermedia* (Griff.) Bakh., 1921]. *Avicennia marina* var. *obovata* Bakh. ex Moldenke, Résumé 235, in syn. 1959.

Literature: Rumph., Herb. Amboin. 3: 115--116, pl. 76. 1743; Blanco, Fl. Filip., ed. 1, 504 (1837) and ed. 2, 353. 1845; Miq., Fl. Ind. Bat. 2: 912. 1856; Hassk., Neue Schlüss. 57. 1866; Blanco, Fl. Filip., ed. 3, 2: 289, pl. 73. 1878; Schimper, Pflanzengeogr. 429, fig. 222. 1898; Karst. & Schenck, Veget.-Bild. 2: pl. 10. 1904; E. D. Merr., Interpret. Rumph. Amboin. 456. 1917; H. Hallier, Meded. Rijksherb. Leiden 37: 89. 1918; H. J. Lam, Verbenac. Malay. Arch. 341--344. 1919; Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 205 & 213--214, pl. 19. 1921; Hill, Ind. Kew. Suppl. 6: 23. 1926; Moldenke, Alph. List Common Names 3 & 7. 1939; Moldenke, Geogr. Distrib. Avicenn. 33 & 34. 1939; Moldenke, Prelim. Alph. List Invalid Names 5, 6, & 32. 1940; Moldenke, Alph. List Invalid Names 5 & 33. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 61, 65--68, & 86. 1942; Moldenke, Phytologia 2: 92. 1944; Lam & Meeuse, Blumea 5: 235. 1945; Moldenke, Alph. List Cit. 1: 4, 16, 49, 52, 107, 120, 131, 137, 161, 191, 200, 208, 254, 312, 315, & 316 (1946) and 2: 354, 416, 423, 424, 438, 462--464, 500, 501, 558, 608, 615, & 630. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 79--80. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 139, 140, 146, 148, 150, & 174. 1949; Moldenke, Alph. List Cit. 3: 670, 727, 728, 739, 758, 810, 838, 855, 858, 874, 886, 894, & 903 (1949) and 4: 1027, 1028, 1033, 1037, 1039, 1040, 1070, 1094, 1100, 1105, 1110, 1115, 1122, 1123, & 1154. 1949; Moldenke, Phytologia 4: 84 & 85 (1952) and 4: 192, 195, & 196. 1953; Moldenke, Résumé 179, 182, 186, 194--196, 198, 200, 203, 235, 236, 319, & 440. 1959; Moldenke, Résumé Suppl. 1: 13 & 14. 1959; Moldenke, Résumé Suppl. 2: 7. 1960.

Illustrations: Rumph., Herb. Amboin. 3: pl. 76. 1743; Blanco, Fl. Filip., ed. 3, pl. 73 [as *A. tomentosa*]. 1878; Schimper, Pflanzengeogr. fig. 222. 1898; Karst. & Schenck, Veget.-Bild. 2: pl. 10. 1904; H. J. Lam, Verbenac. Malay. Arch. pl. 3, E & F. 1919; Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: pl. 19. 1921.

This variety differs from the typical form of the species in the leaf-blades being obovate or rarely almost oblong, rather large, almost identical to those of *A. officinalis* L., widest above the middle, 2 or 3 times as long as wide, obtusely rounded at the apex, attenuate at the base, 5--10 cm. long, 2.5--5 cm. wide, yellowish beneath in drying, the petioles 1.5--3 cm. long, the panicles small and leafy, the bracts foliaceous, and the ovary subpilose.

Bakhuizen van den Brink says that the most conspicuous differences by means of which this variety may be distinguished from A. officinalis are: branchlets, petioles, underside of midribs, peduncles, and other parts covered by a thick gray down, small foliose inflorescences without warty glands and consisting of small capitate cymes which are often arranged in pairs in the leaf-axils, and especially small flowers with their styles short or subobsolete, well-developed stigmas curved outwards, and the ovary glabrous at the base.

Collectors describe it as a shrub or small tree, to 15 m. tall, with a trunk to 7.5 cm. in diameter at breast height and a circumference of 60 cm.; branchlets grayish-green, tomentose; leaves dull-green above, light greenish-yellow beneath; calyx light-green; corolla yellow or dirty-orange, paler outside; stamens brown; style dark-violet; ovary light-green; fruit subcordate, 2.5 cm. long, 1.2 cm. in diameter, dropping into the water and scattered by the current.

It is said to be very common in tidewater swamps by streams in Mindanao, in brackish water in Luzon, a beach tree along tidal streams in Mindoro, very frequent in high mangrove forests in Karakalang, and common along muddy seashores and tidal streams in British North Borneo. In general, it is found along sea-beaches, ascending to 10 m. altitude on Morotai. It has been collected in anthesis from January to June, and in fruit in April. Specimens have most frequently been misidentified as A. officinalis L., while Loher 14879 was misidentified as A. lanata Ridl.

Hasskarl, in the reference cited above, says that Mangium album Rumph. is a combination of A. officinalis L. and A. alba Blume. Merrill, in his Interpret. Rumph. Amboin. 456 (1917) reduces it to A. officinalis, but goes on to say that this species is found "throughout the tropics of the Old World", so obviously has confused it with A. marina and its several varieties.

Vernacular and common names include "affi-affi", "api", "api-api", "api-api puteh", "bunalun-babay", "bungalol", "bungalon", "bunglo", "caju-api-api", "cuban", "dalita", "fika-fika", "fika-fika", "karoaj", "mangi-mangi poeti", "miapi", "piapi", "pipisic", "saoentapi", and "watta cumban". It is worthy of note that the names "api-api" and "fika-fika" are also applied to the typical form of A. marina (Forsk.) Vierh., while "api-api puteh" is applied to A. marina (Forsk.) Vierh., A. lanata Ridl., and A. officinalis L.

In all, 152 herbarium specimens, including the types of most of the names involved, and 3 mounted photographs and illustrations have been examined.

Citations: MALAYA: Penang: Wallich 1742, in part (Cb). Singapore: Hombroen s.n. (P); E. J. Schmidt s.n. [Singapore, 1/4/1900] (Cp, S); Watson & Burkill 3795 (Bz--17106). PHILIPPINE ISLANDS: Busuanga: H. N. Curran s.n. [Herb. Philip. Forest Bur. 3536] (Bz--17094). Jolo: Klemme s.n. [Herb. Philip. Forest Bur. 19521] (Cm, F--425080, Gg--31950). Leyte: Wenzel 1295 (Bm, Cb, E--

801684, F--440927). Luzon: Agama s.n. [Herb. Philip. Forest Bur. 19464] (Cl); Ahern 116 (B, W--445113, W--445642), 148 (B, Bz--17095, W--445114, W--445643), 1164 [116Q] (Bz--17092); J. Clemens s.n. [Pangasinan Prov., Dec. 1928] (Ca--374852); M. K. Clemens s.n. [Pangasinan Prov., Dec. 1928] (Ca--374852); H. Hallier 3522 (Le); Loher 4450, in part (B, Cl, Cl, K, N--photo, Z--photo); E. D. Merrill 1758 (B, W--436709), 2038 (B, Cl, K, W--436991), Sp. Blanc. 583 (B, Bm, Bz--17088, Cl, E--866157, F--482683, Le, P, V, W--904260); Perrottet s.n. [Manila, 1809] (Le), s.n. [Manila, 1819] (Cb, Cb); M. Ramos s.n. [Herb. Philip. Bur. Sci. 4954] (Bz--17096); S. Vidal y Soler, Com. Fl. Forest. Filip. 497 (K, Le); Warburg 13912 (B); H. N. Whitford 579 (W--851683), 1265 (B, K, W--852036). Marinduque: Rosenbluth s.n. [Herb. Philip. Forest Bur. 12170] (Cl). Mindanao: Babaran s.n. [Herb. Philip. Forest Bur. 26140] (Bm); Bolster 399 (Ca--239722); Elmer 10451a (Bm, Bz--17091, Cb, Cl, E--118600, Ed, F--290805, Le, V, Vt, W--779312), 12006 (Bm, Bm, Bz--17093, Cb, Cl, E--118602, Ed, F--291324, Le, Ut--28976, V, Vt, W--779707); Ferraris & Stadtmiller s.n. [Herb. Philip. Forest Bur. 20800] (Cm, E--756209, F--422966, Vt, W--900516); D. P. Miranda s.n. [Herb. Philip. Forest Bur. 18272] (Bz--17089, Ed); Quadras 407 (W--1584704); Whitford & Hutchinson s.n. [Herb. Philip. Forest Bur. 9428] (E--118604). Mindoro: M. T. Cruz 147 (Ur); Kienholz 396 [Herb. Philip. Bur. Sci. 15420] (Ur); E. D. Merrill 2161 (B, W--437109), 2380 (B, K, W--437336). Negros: H. M. Curran s.n. [Herb. Philip. Forest Bur. 19385] (Bz--17090, Le). Panay: Sandique s.n. [Herb. Philip. Forest Bur. 25817] (F--483358). RIOUW ARCHIPELAGO: Doerian: Rachmat 32 (Bz--17105, Le). BRITISH NORTH BORNEO: Cuadra s.n. [Herb. North Borneo Forest Dept. A.3187] (S). CELEBES: Bish 34 [Boschproefst. BB.16715] (Bz--17098); Boer 32 [Boschproefst. BB.3637] (Bz--17101, Le); Kjellberg 525 (Bz--17100, S); H. J. Lam 2675, in part (B, K, Le); J. G. F. Riedel s.n. [Gorontalo] (V); Soekarman 40 [Boschproefst. BB.17196] (Bz--17099); Waturandang E.80 [Boschproefst. BB.18698] (Bz--17097). TALAUT ISLANDS: Karakalang: H. J. Lam 2675, in part (Bz--17103, Bz--17104). MOENA ISLAND: Waturandang 257 [Boschproefst. BB.21795] (Bz--17102). LESSER SUNDA ISLANDS: Soemba: Kornassi 939 (Bz--17083, Bz--17084). MOLUCCA ISLANDS: Amboina: C. B. Robinson, Pl. Rumph. 301 (Bz--17082, K, Le, P, W--654619). Buru: De Vriese & Teijsmann s.n. [Buru] (Le, Le, Le, Le). Ceram: Rutten 939 (B, Le, P, Ut). Halmahera: Forsten s.n. [Gilolo] (Le--908265--626). Little Ceram: Forsten s.n. (Le--908267--690). Morotai: Main & Aden 1618 (Bz--72704, Ng--16926). Ternate: Bequin 933 (Bz--17085). Island undetermined: Collector undesignated s.n. [Molucca] (Le); Herb. Forster s.n. [Molucca] (Le). NEW GUINEA: Avi Island: Warburg 21182, in part (B). Japen Island: Aet & Idjan 706 (Bz--72747), 972 (Bz--72744). Northeastern New Guinea:

Herb. New Guinea Forest Dept. 2404 (Ng—6500). Rombobo Island: Teijsmann 7795 (Bz—17086, Bz—17087). Vurara Island: Waterhouse 313 [Yale Herb. 28608] (F—752689, N). Locality undetermined: Zippelius 59a (Le). LOCALITY OF COLLECTION UNDETERMINED: Labillardier s.n. [1806] (Dc); Warburg 18074 [Küste Batchran] (B).
MOUNTED ILLUSTRATIONS: Blanco, Fl. Filip., ed. 3, pl. 73 (Mu).

AVICENNIA MIOCENICA Berry, Bull. Torrey Bot. Club 63: 65, pl. 3, fig. 1—3. 1936.

Literature: Berry, Bull. Torrey Bot. Club 63: 65, pl. 3, fig. 1—3. 1936; Moldenke, Geogr. Distrib. Avicenn. 41. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 75 & 86 (1942) and [ed. 2], 166 & 174. 1949; Moldenke, Résumé 226 & 440. 1959.

Leaves under the average size of those in *A. germinans* (L.) Stearn, variable in form, narrowly ovate or broadly lanceolate to sometimes subobovate, acuminate to bluntly pointed at the apex, rounded to rather narrowly cuneate at the base, entire, coriaceous, 7.5—8 cm. long, 1.75—2.6 cm. wide; midrib stout and prominent; secondaries numerous, stout, subparallel, camptodrome, their angle of divergence dependent on the form of the blade; tertiaries mostly obsolete. The petiole is not preserved.

The type was collected at Station 27 N, 2 E, on the De Mares concession, in the Magdalena valley, Santander, Colombia, in rocks of Miocene age.

AVICENNIA NITIDIFORMIS Berry, U. S. Geol. Surv. Prof. Paper 91: 347—348, pl. 107, fig. 4. 1916.

Literature: Berry, U. S. Geol. Surv. Prof. Paper 91: 347—348, pl. 107, fig. 4. 1916; Moldenke, Geogr. Distrib. Avicenn. 41. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 75 & 86. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 42. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 166 & 174. 1949; Moldenke, Résumé 226 & 440. 1959.

Illustrations: Berry, U. S. Geol. Surv. Prof. Paper 91: pl. 107, fig. 4. 1916.

Petioles short, stout; leaf-blades medium-sized, coriaceous, lanceolate in general outline and mostly somewhat falcate and consequently slightly inequilateral, about 8 cm. long, the maximum width at or slightly below the middle about 2.1 cm., mostly widest at the middle and tapering to both ends, narrowly rounded at the apex, cuneate at the base, entire, often irregularly curved; midrib stout, prominent beneath; secondaries stout, 9 or 10 pairs, subprominent, diverging from the midrib at 35—40° angles, ascending with but slight curvature close to the margins, where they turn upwards rather abruptly to join the secondary next above and thus collectively form a pseudoacrodrome marginal vein along each margin; tertiaries immersed in the leaf-substance.

The type of the species was collected by Edward Wilber Berry in the Holly Springs sand at Early Grove, Marshall County, Mississippi, of Eocene age, and is deposited in the United States National Museum at Washington. The collector says that the

species is not common in the material thus far uncovered. He states that "It may be matched with some of the leaves of the existing A. nitida and in connection with the fruits from Puryear, Tennessee, described at A. eocenica, renders the generic determination reasonable conclusive.....All the existing species are inhabitants of tidal muddy shores and are cosmopolitan in tropical regions. One species, Avicennia nitida, reaches the Florida coast. Its leaves exhibit considerable variation, both in size and outline, ranging from small obovate to lanceolate and lanceolate-elliptical forms, which may be rounded or acuminate distad. Among numerous leaves of this species the fossil is nearer to the average form of the existing species than to any of its variants. It agrees rather closely in size, outline, and venation with this mean form, but is relatively slightly narrower."

AVICENNIA OFFICINALIS L., Sp. Pl., ed. 1, 1: 110. 1753 [not A. officinalis H. J. Lam, 1940, nor Maxim., 1932, nor Millsp., 1930, nor Schau., 1856].

Synonymy: Anacardium orientale Houst., Dendr. 156. 1662. Oepata Rheede, Hort. Malab. 4: pl. 45. 1683. Avicennia tomentosa Willd., Sp. Pl. 3 (1): 395. 1800 [not A. tomentosa Blanco, 1845, nor Blume, 1918, nor R. Br., 1851, nor Jacq., 1760, nor L., 1821, nor L. & Jacq., 1783, nor G. F. W. Mey., 1818, nor Nutt., 1947, nor Nutt. & Br., 1832, nor Schau., 1940, nor Sieber, 1844, nor Sw., 1864, nor Vahl, 1921, nor Wall., 1851, nor Weigelt, 1851]. Avicennia oepata Hamilt., Trans. Linn. Soc. Lond. Bot. 17: 221. 1835. Avicennia tomentosa Roxb. ex Hamilt., Trans. Linn. Soc. Lond. Bot. 17: 221, in syn. (1835); Watt, Dict. Econom. Prod. Ind. 1: 361. 1839. Avicennia tomentosa var. asiatica Walp., Repert. Bot. Syst. 4: 133. 1845. Avicennia obovata Griff., Notul. Plant. Asiat. 4: 189. 1854. Avicennia oepata Buch.-Ham. ex Jacks., Ind. Kew. 1: 254. 1893. Avicennia officinalis var. tomentosa Cowan, Rec. Bot. Surv. India 11: 199 & 220. 1928. Avicennia obtusifolia Wall. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940. Avicennia officinalis L. ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Avicennia affinalis L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947. Avicennia oepata Buch. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947. Avicennia officinale L. ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960. Avicennia officinalis Blume ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960.

Literature: Houst., Dendr. 156. 1662; Rheede, Hort. Malab. 4: pl. 45. 1683; Ray, Hist. Pl. 2: 1566. 1693; Pluk., Almag. Bot. 28. 1696; Rumph., Herb. Amb. 3: 115, pl. 76. 1743; L., Fl. Zeyl. 23. 1748; L., Sp. Pl., ed. 1, 1: 110. 1753; Forst., Pl. Escul. 72--73. 1784; Willd., Sp. Pl. 3 (1): 395. 1800; Pers., Syn. Pl. 2: 143. 1807; Nutt., Amer. Journ. Sci. 5: 296. 1822; Blume, Bijdr. Fl. Ned. Ind. 14: 821. 1826; Wall., Pl. Asiat. Rar. 3: 44,

pl. 271. 1832; Roxb., Fl. Ind., ed. 2 [Carey], 3: 88—89. 1832; Nees, Rob. Br. Schrift. 5: 401. 1834; Hamilt., Trans. Linn. Soc. Lond. Bot. 17: 219—222. 1835; Walp., Repert. Bot. Syst. 4: 133. 1845; Schau. in A. DC., Prodr. 11: 700. 1847; Wight, Ic, Fl. Ind. Or. 4: pl. 1481. 1849; Wight, Illustr. Ind. Bot. 2: pl. 173 bis. 1850; Schau. in Mart., Fl. Bras. 9: 304 & 306—308. 1851; Griff., Notul. Plant. Asiat. 4: 189. 1854; Schnitzlein, Iconogr. 2: pl. 137**. 1856; Miq., Fl. Ind. Bat. 2: 912—913. 1856; Montr., Acad. Sci. Lyon Mém. Sect. Sci., sér. 2, 10: 241—242. 1860; Miq., Fl. Ind. Bat. Suppl. 1: 244. 1860; Hook., Handb. New Zeal. Fl. 224. 1864; Hassk., Neue Schlüss. 57. 1866; F. Muell. in Landsb., Expl. Austr. 119. 1866; Hook., Handb. New Zeal. Fl. 772. 1867; Benth. & Muell., Fl. Austral. 5: 69. 1870; Beddome, Fl. Sylv. Anal. Gen. pl. 22. 1872; Roxb., Fl. Ind., ed. 3 [Carey], 487. 1874; Scheffer, Ann. Jard. Bot. Buitenz. 1: 44. 1876; Kurz, Forest Fl. Brit. Burma 2: 276. 1877; J. G. Baker, Fl. Maurit. 257. 1877; Murray, Pl. & Drugs Sind 176. 1881; F. Muell., First Census 103. 1882; F. Muell., Pl. Sharks Bay 20. 1883; F. M. Bailey, Syn. Queensl. Fl. 381. 1883; Treub, Ann. Jard. Bot. Buitenz. 3: 79—87, pl. 14 & 15. 1883; Vidal, Sinop. Fl. For. Filip. 201, 206, & 336 & Atlas 36, pl. 75, fig. G. 1883; C. B. Clarke in Hook. f., Fl. Brit. Ind. 4: 604. 1885; Hemsl., Scient. Res. Voy. Challenger Bot. 1: 110 & 178. 1885; Miq., Fl. Ned. Ind. 4: 604. 1885; F. Muell., Key Victor. Pl. 2: 43. 1885; Maxim., Bull. Acad. Imp. Sci. St. Pétersb. 31: 88. 1886; F. Muell., Key Victor. Pl. 1: 397. 1887—1888; F. Muell., Sel. Extratr. Pl., ed. 7, 55. 1888; F. M. Bailey, Queensl. Woods, ed. 1, 93. 1888; Hedley, Proc. Roy. Soc. Queensl. 5: 11. 1888; Kirk, For. Fl. New Zeal. 271—272, pl. 130. 1889; Watt, Dict. Econom. Prod. Ind. 1: 360—361. 1889; F. Muell., Second Census 173. 1889; Maiden, Usef. Nat. Pl. Austr. 9, 120, 380, & 638. 1889; Forbes & Hemsl., Fl. Sin. 2: 265. 1890; F. M. Bailey, Cat. Pl. Queensl. 36. 1890; Tate, Handb. Fl. Extratr. S. Austr. 156 & 254. 1890; Schimp., Indo-mal. Strandfl. 98. 1891; Karst., Bibl. Bot. 5 (22): 20—21, pl. 6, 8, & 10. 1891; Schimp., Bot. Mitteil. Tropen 3: 98 & 129, pl. 6, fig. 2 & 3. 1891; Baill., Hist. Pl. 11: 88. 1891; Warburg in Engl., Bot. Jahrb. 13: 426. 1891; Kuntze, Rev. Gen. Pl. 2: 502. 1891; Moore, Handb. Fl. N. S. Wales 358. 1893; Jacks., Ind. Kew. 1: 254. 1893; Newbery, Descr. Cat. Econ. Woods Vict. 8. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 181. 1894; J. G. Baker, Kew Bull. 1894: 150. 1894; Trimen, Fl. Ceylon 3: 363. 1895; Hemsl., Ann. Bot. 10: 247. 1896; Koord., Meded. Lands Plant-tuin 19: 558. 1898; Schimp., Pflanzen-Geogr. 429 & 431, fig. 222 & 224. 1898; Gürke & Volkens, Notizbl. Bot. Gart. Mus. Berlin 2: 173. 1899; F. M. Bailey, Queensl. Woods, ed. 2, 106. 1899; Koord. & Val., Bijdr. Booms. Java 7: 217 & 221. 1900; J. G. Baker in Thistel.-Dyer, Fl. Trop. Afr. 5: 332. 1900; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 527. 1900; F. M. Bailey, Queensl. Fl. 4: 1185. 1901; Prain, Bengal Pl. 2: 838. 1903; Karst. & Schenck, Veget.-Bild. 2: pl. 10. 1904; J. Schmidt, Bot. Tidsskr. 26: 60—68 & 97, fig. 28—30 & 43 (8). 1904; F. N. Williams, Bull. Herb. Boiss., sér. 2, 5: 432. 1905; E. D. Merr., Bur. Gov.

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Shrub or tree, often much branched from near the base, to 25 m. tall, mostly of poor form, sending down adventitious roots from low branches overhanging water; trunk to 1 m. in diameter, often crooked, the bole to 7 m. tall, sometimes with stilt roots on the underside of the leaning trunk; crown scraggly; wood gray, with a darker heartwood, hard, heavy, with interlocked grain and prominent ring-pores, consisting of numerous, narrow, well-marked, concentric layers, weighing 58 pound per cubic foot, very brittle, the sapwood often undefined, pale straw-colored, distinctly ring-pored, the true wood straw-color or pale straw-color, the rings about 3.5--7 mm. apart; bark birch-like, brownish-gray, thin, with no exudation, becoming rough, blackening progressively in age and loosening, or the outer bark yellowish-green and the inner bark white, about 7 mm. thick; branchlets spreading, nutant, terete, smooth, the youngest parts closely appressed-tomentellous, glabrescent in age, sparsely resinous-punctate and lenticellate; petioles medium-stout, 0.5--2 cm. long, glabrescent; leaf-blades coriaceous, obovate or broadly oblong, dark-green above, 4--12 cm. long, 2--6 cm. wide, rounded at the apex, slightly revolute along the margins, subcuneate or often rounded at the base and shortly attenuate into the petiole, glabrous and eventually shiny above and very minutely glandulose, appressed-tomentellous beneath, often fulvous in drying, resinous-punctate beneath the pubescence, bitter and somewhat salty to the taste; midrib prominent and subglabrous beneath; secondaries 5--15; veinlets obsoletely reticulate; inflorescence terminal, paniculate, bracteate, rarely subfoliose, 3--15 cm. long, 10--15 cm. wide, the panicles terminal and in the axils of the uppermost leaves, solitary or paired, pedunculate, 1--3-branched, the cymes dense, subcapitate or rarely elongate and dissitiflorous, 1--1.5 cm. long, 1--2 cm. wide, consisting of 2--12 decussate flowers; peduncles green or subfuscous, obsoletely tetragonal, densely appressed-furfuraceous, subglabrescent in age, densely resinous-punctate and densely verruculose with elevated glands; bracts small, sessile, rounded-ovate, densely tomentose from the base to the middle, glabrate toward the apex, green, soon blackening, scarious, caducous; bractlets two, 3--5 mm. long, rounded-ovate or subreniform, obtuse at the apex, resinous-punctate on both surfaces, ciliate-margined, rugose beneath and densely tomentellous from the base to the middle, glabrate toward the apex, rather shiny, glabrous on the upper surface or white-pilose toward the base; flowers sessile, large, unpleasantly scented, said to be narcotic, 7--10 mm. long, 12--15 mm. wide; calyx persistent, large, the lobes rather unequal, rounded-ovate, 5--6 mm. long, 3--5 mm. wide, subtrinnerved, densely ciliate-margined, sparsely resinous-punctate on both surfaces, soon scarious, glabrous and shiny above, rugulose and green beneath, densely white-tomentellous toward the base beneath but glabrous toward the apex; corolla large, yellow or yellow-brown, soon becoming almost orange-colored, rather thick-textured, dropping off

after anthesis, the tube campanulate, equaling or slightly exceeding the calyx, 2--4 mm. long, glabrous on the outside, its throat 5--6 mm. wide, the lobes rather unequal, rather obtusely oblong or ligulate, spreading in radial fashion, 3--5 mm. long and wide, retuse, the posterior one patent and broader, with its apex incised, the 3 anterior ones very patent or reflexed, glabrous on the inner surface, very densely whitish-villosulous on the outer surface, but glabrous on the margins; stamens short-exserted, shorter than the corolla-lobes, 2--4 mm. long; filaments much longer than the anthers; anthers broadly oblong, fulvous, soon becoming pitch-black, 1--1.2 mm. long, the pollen white; ovary conic, completely covered with long, whitish, appressed hairs, densely resinous-punctate; style filiform, elongate, almost completely short-tomentellous with white hairs, resinous-punctate, subappressed to the corolla-tube, scarcely exserted, excrescent after anthesis and long-exserted from the calyx, 3--4 mm. long; stigma subtabescent, unequally and acutely bifid, incurved; fruit large, greenish-purple, broadly ovate or amygdaloid, rounded or subcordate at the base, compressed laterally, increasing in size after being shed, germinating only in water; cotyledons large and thick, almost always very densely long-setose, developing into medium-sized seed-leaves that are narrowly lanceolate and attenuate-acute at both ends, green or mostly greenish-purple; hypocotyl at the most only half as long as the inner cotyledon, pubescent for only a short distance, the side-rootlets and plumule conspicuous even in the fruit.

This is the type species of the genus, and is found in salt-marshes and tidal forests, at river mouths, and along seashores from India, East Pakistan, Tenasserim, the Andaman Islands, and Ceylon through the coasts of Indochina, Thailand, and Malaya to the Philippines, Sumatra, Madura, Java, Borneo, Celebes, the Lesser Sunda Islands, Molucca Islands, and New Guinea, south to New South Wales.

Vernacular names reported for it are "afi-afi", "api-api", "api-ápi", "api-api brajoe", "api-api daun bebar", "api-api katjang", "api-api-katjang", "api-api ludat", "api-api puteh", "api-ragajoe", "appi-appi", "baen", "bani", "bara baen", "bien", "bina", "bind", "black mada", "bogem", "bogem", "bunalun-lalague", "bungálon", "bunfálon", "byna", "caju cantekka", "calapini", "carils", "cây mām", "cheria", "cheriá", "efi", "hapi-hapi", "hapi-hapi-brajoe", "kajoe-api-api", "kajoe doadoek", "kajoe kéndéka", "kajoe kendeka", "kajoe kéndéka", "kajoe ting", "kandalu", "kanna", "ki balanak", "kibalanak", "ki blanak", "kokidi", "lame", "lameb", "la-met", "lamet", "ludat", "mada", "mada-chettu", "manggi-manggi poetih", "metbin", "miápi", "nala mada", "nala-mada", "nalla", "nalla mada", "nalla-mada", "oepali", "oepata", "orei", "palétuvier", "pe-ape", "pè-apè", "pepe pepe", "pépé pépé", "piápi", "pipisic", "saladillo", "salgueira", "sammaek ruaek-mum", "tamelhã", "thamé", "tiabaen", "timmer", "tloes lewo", "tivar", "udat", "upputti", "wata koemban", "white api-api", "white mangrove", and "zoutboom".

The name "Avicennia officinalis" has been very widely misap-

plied by authors and by herbarium workers, resulting in great confusion in literature and herbaria. Foxworthy, for instance, says that A. officinalis can scarcely be distinguished from A. alba Blume, while Lam actually places A. alba in the synonymy of A. officinalis. Actually, these two species are the most uniformly distinct taxa in the entire genus, and it seems inconceivable that they should be confused with each other! It is most probable that these authors based their concept of the two species on misidentified herbarium specimens, without consulting the types. Most authors on the African flora, as well as those writing on the flora of the Seychelles, Mauritius, Madagascar, and the Arabian Peninsula (e.g., Baker, Pearson) have misapplied the name "A. officinalis" to material which actually represents A. marina (Forsk.) Vierh. Other authors, like Schauer, Domin, Foxworthy, etc., include A. marina by inference in their statement that "A. officinalis" ranges to tropical and subtropical Africa. Baker, Pearson, and others have actually extended the supposed distribution of this species to the "tropical shores of both hemispheres", thus apparently including A. marina, A. germinans (L.) Stearn, A. schaueriana Stapf & Leechman, A. bicolor Standl., and A. tonduzii Moldenke in this catch-all "species"! Houard refers to the Guiana material of A. germinans as "A. officinalis", and most of the writers on the flora of the Galapagos Islands refer to the species occurring there as "A. officinalis." Pearson included the west African A. africana P. Beauv. in the synonymy of his "A. officinalis", while Schauer included A. alba, A. marina, and A. marina var. resinifera (Forst.) Bakh. in his description and synonymy. Some authors (e.g., Lam, Kuntze, Crevost & Pételot) reduce almost all the other known species and varieties of the genus to synonymy under A. officinalis — which is ridiculous. What Biswas calls "A. officinalis" is actually A. marina, and what he calls "A. tomentosa" is actually the real A. officinalis.

Lam, in his Verbenac. Malay. Arch. pl. 3 (1919), illustrates the leaves of various forms of Avicennia under the collective name of "A. officinalis". In my opinion, his figs. A, B, C, and H represent A. officinalis, his figs. D, G, J, and K are A. marina, figs. E and F are A. marina var. rumphiana (H. Hallier) Bakh., figs. L, P, Q, R, S, T, and U are A. eucalyptifolia Zipp., and figs. M, N, and O are A. alba.

Miquel, on page 912 of the 1856 reference cited above, includes in the synonymy of A. officinalis the following binomials: Mangium album Rumph., A. officinalis Schau., A. resinifera Forst., A. tomentosa R. Br., and A. eucalyptifolia Zipp. Of these, I regard the first two as synonyms of A. marina var. rumphiana, the next two as synonyms of A. marina var. resinifera, and the fifth as a valid species.

Pearson, on page 226 of the 1910 reference cited above, in-

cludes A. resinifera Forst., A. tomentosa Jacq., A. tomentosa var. arabica Walp., A. africana P. Beauv., and A. meyeri Miq. in the synonymy of this species! Of these, the first is now regarded as A. marina var. resinifera, the second and last are A. germinans, the third as A. marina, and the fourth is a valid species.

Schauer in Mart., Fl. Bras. 9: 306 (1851) includes A. resinifera Forst., A. tomentosa R. Br., A. alba Blume, Sceura Forsk., Halodendron Thou., Halodendron thouarsii Roem. & Schult., Oepata Rheede, Mangium album Rumph., Rack Bruce, A. tomentosa Wall., and A. tomentosa Sieber in the synonymy of "A. officinalis", all of which names, with the exception of Oepata, actually belong elsewhere!

Miss Greene in Kew Bull. 1935: 509 (1935) makes the remarkable statement that "Recently Ewart and Davies, Fl. N. Territory, p. 239 (1917) have reduced T. subacaulis F. Muell. to Avicennia officinalis L." Actually, they do no such thing in the reference cited! They merely state there that Tatea subacaulis ["acaulis" is a misspelling] has been recorded from "Northern Australia", but that no actual specimens from the Northern Territory were seen by them to verify this record.

The name "A. tomentosa Willd." is given by Nuttall, Amer. Journ. Sci. 5: 296 (1822), as a valid name, but actually applies to A. germinans.

According to Stearn, on page 35 of the 1958 work cited above, "The name A. officinalis L. is to be typified by the Indian plant which is represented as 'Oepata' in Rheede's Hortus Indicus Malabaricus 5: t. 45 (1683), the restricted type-locality for this being the coast of Cochin, southern India." On the Kew sheet of Thwaites 1961 Otto Stapf has written "an excellent match of the specimen in Herb. Linn." The type of A. obtusifolia is Wallich s.n. [Sunderabund & Insula Gangis] in the Copenhagen herbarium.

Houard, in the reference cited above, says that "A. officinalis" is infested with the galls of an undetermined insect in Guiana, but this statement undoubtedly refers to A. germinans.

Watt describes A. officinalis as a small tree or shrub of the salt-marshes and the tidal forests of India, Burma, and the Andaman Islands. He affirms that it is found "everywhere" in the Sunderabans, often becoming a tree of considerable size, while on the Coromandel coast it is only a bush. Roxburgh says that it is common near the mouths of rivers where the spring tides rise, that it is "common" in India in low places near the mouths of rivers and in salt-marshes. In the lower parts of the Delta of the Ganges it grows to be a tree of considerable magnitude and is "abundant on the Bombay and Malabar coasts". It is not certain, however, how much of this description actually applies to this species and how much to A. marina. Kurz reports A. officinalis as frequent along the Burmese coast from Chittagong to Tenasserim.

Birdwood reports that the bark is used as a tanning agent in Bombay, while Drury says that the ashes of the wood are used to wash cloth. Watts maintains that the roots possess aphrodisiac properties, while the unripe seeds are used as a poultice to hasten suppuration of boils and abscesses. Hill states that the "Dhobies in the Madras Presidency use the ashes of the wood for washing and cleaning cotton cloths. It is also used in small-pox. The bark is used in Rio de Janeiro for tanning." Dymock says "the bark is astringent", while Gidie reports "bark astringent, ashes used for washing and bleaching cloth; common in Madras". Watt describes the "kernels" as bitter, but edible; the very brittle wood used in India only for firewood. Ford, however, asserts that the wood is used for mills for husking paddy, rice-pounders, and oil-mills in the Andaman Islands. Rheede says that the ashes obtained by burning the wood and the fruit are used in Malabar for bleaching clothes, and are used by painters "for mixing their colors". The astringent bark is used in Bombay and Sind for tanning purposes. The fruit is eaten "everywhere" after a preliminary preparation, generally by cooking or soaking it in water for a long period of time and then often drying it in the sunshine to rid it of its bitterness. Rheede also reports that the seeds are cooked with the leaves of Ipomoea campanulata L. and with butter, and from this an ointment is made for the "ripening" of pimples and tumors. The wood is employed as piling for wharves. In Celebes it is used for building houses, but is only durable enough for the interiors. In seawater it is said to be virtually indestructible, which fact makes it useful for the building of small boats. In Java the trunks are used to make rice-blocks. In Celebes the black heartwood of old trees is powdered and used as an ointment in the treatment of headaches.

Because of the mixup of A. marina with A. officinalis in literature and herbaria, the descriptions of the latter species as given by most authors are either entirely erroneous (applying entirely to A. marina) or are a composite of the characters of both species. Watt, for instance, says that the style is very short in "A. officinalis" and is long and slender in "A. tomentosa". His "A. officinalis" is apparently actually A. marina, while his "A. tomentosa" is in reality the true A. officinalis.

Lam in Bot. Jahrb. 59: 29 (1925) records Volken 193 from Yap, but I have not as yet seen this collection. It is more probably A. alba, which is the only species of the genus known to me from the Caroline Islands. He describes "A. officinalis" as being found "in Flussmündungen und am Meeresstrande in Ostafrika, Asien, Australien, Neu-Seeland, Polynesien, in tropischen und subtropischen Gebieten als ein Element der Mangrove-Formation." He obviously has confused the species here with A. marina, as he has also done in his Verb. Malay. Arch. 340—344. (1919).

The Balansa 1337, Petrie 8316, and United States Expl. Exped. [Wilkes] s.n. [Sydney], all previously regarded by me as being A.

officinalis, are actually A. marina var. resinifera, while Warrburg 17522, previously thought to represent A. lanata, seems actually to be A. officinalis. The Herb. Peradeniya 523 specimen cited below is not typical — it may represent an as yet undescribed variety. Yates 2075 in the University of California herbarium has a photograph attached showing a close-up view of the twigs and flowers. The species is recorded from the Salajar Islands in Blumea 2: 262 (1937).

J. G. Baker, in the 1894 reference cited above, says that A. officinalis is found in "mangrove swamps from Polynesia to East Tropical Africa, constantly associated with Rhizophora mucronata." He is referring here, in part, at least, to A. marina. In his 1877 work he records A. officinalis from Mahé and Praslin, in the Seychelles Islands, but here, again, the plant referred to is actually A. marina. The MacOwan 1941 and 3203, Drège s.n., Krauss 241, Sanderson 886, Plant 21, Wood 395 and 1360, Wilms 2229, Rehmann 9004, Cooper 1233, Peddie s.n., and Junod 500, all cited by Pearson on page 226 of the 1910 reference listed above from the Union of South Africa are all A. marina. He says that A. officinalis is found "on the tropical shores of both hemispheres", which, of course, is not true! It is actually found only from India and East Pakistan to New Guinea and Australia. It is not found at all in the Western Hemisphere. Similarly, the Slade 2, Steudner 1307, Bent s.n., Ehrenberg s.n., Quarton-Dillon s.n., Hildebrandt 731 and 1241, Schweinfurth & Riva 61, Beccari s.n., Playfair s.n., Terracciano s.n., Wakefield s.n., Volken 160, Holst 3059, Kirk 11, 45, and s.n., and Peters s.n., all cited by Baker in Thiselt-Dyer, Fl. Trop. Afr. 5: 332 (1900) are A. marina. He erroneously claims that A. officinalis grows "Also in Egypt, Natal, and the tropical shores of both hemispheres". The Collector undesignated s.n. in the Buitenzorg herbarium is a mixture with A. alba, while Teijsmann 1753 H.B. in the same herbarium is a mixture with A. marina.

Crevost & Pételot, in the reference cited above, include the following binomials in the synonymy of A. officinalis: A. tomentosa Jacq., A. africana P. Beauv., A. alba Blume, A. elliptica Thunb., A. floridana Raf., A. intermedia Griff., A. lamarckiana Presl, A. meyeri Miq., A. oblongifolia Nutt., A. obovata Griff., A. oepata Buch., and A. resinifera Forst., many of which actually represent entirely different taxa.

Hooker, in his Handb. New Zeal. Fl. 224 (1864) recorded "A. officinalis" from "Chatham Island" on the authority of Dieffenbach. According to Cheeseman, Man. New Zeal. Fl., ed. 2, 765 (1925) this is an error based on a sterile specimen of Olearia traversii F. Muell.

The true Avicennia officinalis has been collected in anthesis in April, June, July, August, and December, and in fruit from

May to September. It is probable that it flowers and fruits practically throughout the year. It ascends to 50 meters altitude in Papua. Brass states that it "sends down adventitious roots from low branches overhanging water", while Jackson & Hart definitely assert that there are stilt-roots on the underside of leaning trunks. This is an unusual condition for the genus. Usually it is members of the genus Rhizophora, regularly growing in association with Avicennia, which exhibit the stilt roots. Aet & Idjan describe the flowers as "green", but surely in error. Herbarium material has been misidentified by herbarium workers as A. alba Blume, A. germinans L., A. tomentosa L., Bontia germinans L., and even as Acrotrema costatum Jack.

Briquet, in the reference cited above, quotes Schimper, "der diese Arten in situ genau studiert hat", as saying that the three species which he recognizes can be distinguished as follows:

1. Flowers white; fruit germinating on the tree; hypocotyl almost as long as the inner cotyledon, pubescent almost its whole length, mostly without visible side-rootlets in fruit; plumule not visible with the naked eye.

2. Stigmas subsessile; corollas glabrous on the inner surface..
A. schaueriana.

2a. Pistil as long as the stamens; corolla pubescent within....
A. germinans.

1a. Flowers ocher-yellow; fruit germinating only in water; hypocotyl at most only half as long as the inner cotyledon, pubescent for only a short distance; side-rootlets and plumule conspicuous even in fruit.....A. officinalis.

Schimper obviously includes A. africana in A. germinans, and A. marina in A. officinalis.

In all, 409 herbarium specimens, including the types of all the names involved, and 10 mounted photographs and illustrations have been examined.

Citations: INDIA: Bombay: Gammie s.n. [Bassein, Aug. 1905] (Bm), s.n. [Bassein, Aug. 1908] (K, K); Hohenacker 68, in part (B, B, Cb, Cb, Cp, K, Le, Mu—1079, P, Us, Ut, V, V, X); W. A. Talbot 531 (Cl, Dd, K, N). Madras: Beddome 6535 (Bm); Collector undesignated s.n. [Porto Novo] (K); Cornwell 4 (Dd, Dd); Foulkes 104 (Cl); Gamble 18211 (Bm); Rottler s.n. [Trankenbar] (Mu—1458); R. Wight 770 (Ed), 2599, in part (Ed, Ed). Orissa: Mooney 3347 (N). Travancore: Bourdillon 262 (Cl), s.n. (Cl); Gamble 14764 (K); Rama Rao 1145 (Dd); R. Wight 2328 (Cl, K, Le). United Provinces: Herb. Forest Research Inst. Dehra Dun 4357 (A, N, Y), 4359 [2] (N). West Bengal: Biswas 790 (Cl); C. B. Clarke 8470 (Bm, Cl), 21660 (Cl, W—802813), 21660b (Bm); J. M. Cowan 35 (Ed), 512 (Ed), s.n. [11/4/27] (Ed); Haines 4161 (K); F. Hamilton 1364 (Ed); Heinig 65 (B, Dd, N), s.n. (Cl); Hooper 12543 (Cl), s.n. [G. H. Watt 12543] (Ed); Janardan s.n. [June 14,

1899] (W--516517), s.n. [Matla] (Cl, Cl, Dd); Kurz s.n. [Mutlah] (Cl); Lace 2320 (Dd, Ed, K); Nath 2 (Dd), 331 (Dd), 333 (Dd); C. E. Parkinson s.n. [Gipsah] (Dd); Prain s.n. [30 July 1902] (Dd, K), s.n. [Aug. 1, 1902] (Cl, K, W--516516), s.n. [Aug. 7, 1902] (Cl, Cl, Na--19555), s.n. [Sept. 30, 1902] (Cl); Proshad 18283 (Cl), 26744 (Ed); Sarkar I (Cl), II (Cl); Wallich s.n. [Sunderabund & Insula Gangis] (Cp). State undetermined: Collector undesignated s.n. [Takwapari, 8.7.27] (Cl); F. Hamilton s.n. [Kyeemeedam] (Bm); Rottler s.n. [Ind. orient.] (Br); Roxburgh s.n. (Ed, Ed); Wallich 1184 (Dc), s.n. [Ind. orient.] (Cp), s.n. (Cp); R. Wight 81 (K). BURMA: Tenasserim: H. B. Anthony 26026 (Cl); H. Falconer 388 (Bz--17227, Bz--17228, Cb, Cl, Dd, Mu--1080, P); Helfer 6069 (Cl, K); Herb. Bot. Surv. Tenass. Circle 140 (Cl); Kurz 1025 (Cl), 1026 (Cl); Manson 406 (Cl); McLellan s.n. [Rangoon] (Ed); C. E. Parkinson 14472 (Dd), 14647 (Dd), 14999 (Dd); C. G. Rogers s.n. [Rangoon Timber Depot] (Cl, Dd, Dd); Sukoe 11020 (Dd). ANDAMAN ISLANDS: South Andaman: King's Collector s.n. [28/6/90] (Cl), s.n. [30.7.92] (Cl, Cl, Us). CEYLON: Collector undesignated s.n. (W--201660); Herb. Peradeniya 523 (N, N, N); Thwaites 1961, in part (B, B, Bm, Cb, Cl, K, P, V, V, X), s.n. (Vu). INDOCHINA: Cochinchina: Herb. Forestier s.n. (P); Pierre 478 (P, P), s.n. [2/1869] (P), s.n. [Bentre] (N), s.n. (B). State undetermined: Talmy s.n. (P, P). THAILAND: Kerr 2095 (B, Cl). MALAYA: Kedah: Boswell s.n. [Herb. Forest Dept. F. M. S. 9010] (Ed). Lumut Island: Herb. Forest Dept. F. M. S. 16709 (A, N). Malacca: Collector undesignated s.n. (Cl); W. Griffith 6069 (K, P), s.n. [Malacca, 1845] (K); Maingay 1208 (K); Sonnerat s.n. [Herb. Adans.] (P). Penang: Wallich 1742, in part (B, Cl, Dc, Dc, K). Selangor: Burkill 3129 (Bz--17226); Cubitt s.n. [Feb. 1917] (K); Herb. Forest Dept. F. M. S. 3280 (K), 36625 (N), 36626 (N), 36627 (N), 36628 (A, N), 36629 (A, N), 36630 (A, N); F. G. Utjang s.n. [Herb. Forest Dept. F. M. S. 4718] (K). Singapore: T. Anderson 79 (Cl); Collector undesignated 892 (B), s.n. (Bz--16968, E--118597); M. R. Henderson 34770 (Bz--17224, Bz--17225); Nur s.n. [Sungai Benban, May 29, 1934] (F--752071, N); H. N. Ridley 10370 (Cl), s.n. [1892] (Bm), s.n. [Singapore] (B, B, B, B, Cl). Wellesley: F. T. Brooks 16 (K). State undetermined: Herb. Forest Dept. F. M. S. 16717 [timber 2441] (Ma). PHILIPPINE ISLANDS: Luzon: Alvarez s.n. [Herb. Philip. Forest Bur. 21470] (Cl, F--422850, Vt); Cailipan s.n. [Herb. Philip. Forest Bur. 26946] (E--837082, F--484003); Elgincolin s.n. [Herb. Philip. Forest Bur. 28064] (Bz--17207); Loher 4450, in part (K); E. D. Merrill 2431 (B, K), s.n. [April 1903] (W--437538); Ocfemia s.n. [Malate, Marzo 1903] (E--1017518); Perrottet s.n. [1809] (Le); Vidal y Soler 496 (K); H. N. Whitford 588 (K, P, W--851686). Mindanao:

D. P. Miranda s.n. [Herb. Philip. Forest Bur. 24763] (E--836782, F--483300); Piper 175 (B). Mindoro: M. L. Merritt s.n. [Herb. Philip. Forest Bur. 9796] (Br, Bz--17209, E--118599). Negros: H. M. Curran s.n. [Herb. Philip. Forest Bur. 19386] (Cl, Ed). Palawan: Fénix s.n. [Herb. Philip. Bur. Sci. 15596] (B, Le); Foxworthy 761 (B, E--118598), s.n. [Herb. Philip. Bur. Sci. 761] (Bz--17208, W--627069); Manalo s.n. [Herb. Philip. Forest Bur. 7494] (B). Samar: Valderrama s.n. [Herb. Philip. Forest Bur. 25835] (E--834261). SUMATRA: Barends 36 [Boschproefst. BB.8879] (Bz--17239); Gusdorf 15 (Bz--17219); Lörzing 6028 (Bz--17218, Le); Yates 2075 (Bz--17223, Ca--300520, K, V). MADURA ISLAND: Teijsmann 1753 (Cl), 1753 H.B., in part (Bz--17037). JAVA: Backer 16736 (Bz--17114, Bz--17115, Bz--17116, Bz--17117, Bz--25461), 21142 (Bz--17131, Bz--17132, Bz--17133, Bz--17134, Bz--25465); Bakhuizen van den Brink 450 (Bz--17118, Bz--17119, Bz--17120, Bz--17121, Bz--17122, Bz--25462, Le, P, Ut), 948 (Bz--25464), 1422 (Bz--17124, Ut--24875a); Becking 8 (Bz--17129, Bz--17130); Beumée A.61 (Bz--17113); Bijhouwer 191 (Bz--17123); Collector undesignated s.n. [Java] (Le); C. W. Franck 66 [229] (Cp, W--1596613); Hoogerwerf 29 (Bz--17234, Bz--17235); Junghuhn s.n. (Le); Koorders 9677b (Le), 9678b (Le), 9693b (Bz--17191), 9697b [Boschwezen 6188t] (Bz--17195, Bz--17196), 9698b [Boschwezen 6205t] (Bz--17199), 9699b [Boschwezen 6227t] (Bz--17167), 9700b [Boschwezen 6248t] (Bz--17197, Bz--17198), 9702b (Bz--17192, Bz--17193, Le), 9703b (Bz--17194), 12726b [Boschwezen 6209t] (Bz--17200), 12851b [Boschwezen 6160t] (Bz--17178), 12852b [Boschwezen 6161t] (Bz--17179, Bz--17180), 12875b [Boschwezen 6214t] (Bz--17161), 12876b [Boschwezen 6039t] (Bz--17181, Bz--17182), 12879b [Boschwezen 6168t] (Bz--17162), 12880b [Boschwezen 6213t] (Bz--17163), 12887b [Boschwezen 6225t] (Bz--17669), 12938b [Boschwezen 6224t] (Bz--17164), 12944b [Boschwezen 6223t] (Bz--17165), 12945b [Boschwezen 6210t] (Bz--17166), 12946b [Boschwezen 6220t] (Bz--17183, Bz--25466), 13162b [Boschwezen 6034t] (Bz--17184), 20623b [Boschwezen 6223t] (Bz--17155, Bz--17156), 20624b [Boschwezen 6225t] (Bz--17157, Le), 20625b [Boschwezen 6205t] (Bz--17158, Le), 20626b [Boschwezen 6217t] (Bz--17159), 20627b [Boschwezen 6214t] (Bz--17160, Le), 20628b [Boschwezen 6227t] (Bz--17149), 20629b [Boschwezen 6209t] (Bz--17150, Bz--17151), 20630b [Boschwezen 6213t] (Bz--17152, Le), 20631b [Boschwezen 6235t] (Bz--17153, Bz--17154), 20633b [Boschwezen 6224t] (Bz--17143), 20634b [Boschwezen 6242t] (Bz--17146), 20637b [Boschwezen 6210t] (Bz--17144, Bz--17145), 20683b [Boschwezen 6185t] (Bz--17147, Bz--17148), 20691b [Boschwezen 6193t] (Bz--17135, Bz--17136, Le), 20694b [Boschwezen 6183t] (Bz--17137), 20696b [Boschwezen 6182t] (Bz--17138), 20697b [Bosch-

wezen 6188t] (Bz--17139, Le), 20698b [Boschwezen 6184t] (B, Bz--17140, Ca--265977, Cl, Le), 20703b [Boschwezen 6191t] (Bz--17141, Bz--17142), 30054b [Boschwezen 6209t] (B, Bz--17185, Bz--17186), 30057b [Boschwezen 6213t] (Bz--17187, Bz--17186, Le), 30058b [Boschwezen 6205t] (Bz--17189, Bz--17190, Le), 30354b (Le), 39758b [Boschwezen 6227t] (Bz--17168), 39760b [Boschwezen 6224t] (Bz--17169), 39767b [Boschwezen 6247t] (Bz--17170), 39795b [Boschwezen 6235t] (Bz--17171), 39800b [Boschwezen 6223t] (Bz--17172), 39839b [Boschwezen 6225t] (Bz--17173), 39844b [Boschwezen 6185t] (Bz--17174), 39842b [Boschwezen 6217t] (Bz--17175), 39853b [Boschwezen 6244t] (Bz--17176), 39854b [Boschwezen 6248t] (Bz--17177); Kuntze 5928 (K); E. O. A. Nyman 70 (Us); Teijsmann 1753 H.B. (Le); Valetton s.n. [Herb. Bot. Var. 337; 227] (Bz--17127); Zollinger 2154 (B, Bm, Bz--17128, Cb, Cb, P, S, X). BORNEO: Boschwezen 1979 (Le), 2366 (Bz--17110, Bz--17111, Bz--17112); H. Hallier B.271 (Bz--17109, Le); Van Ileurs 92 [Herb. Boschproefst. BB.9338] (Bz--17230). CELEBES: Boschproefst. CC.3891 (Le); Kjellberg 324 (Bz--17213, S), 530 (Bz--17210, S); Koorders 19484b (Bz--17212); J. G. F. Riedel s.n. [Gorontalo] (K); Teijsmann 13767 (Bz--17214, Bz--17215, Bz--17216, Bz--17217, Le, Le); Versteeg 5 [Herb. Boschproefst. 3891] (Bz--17211). LESSER SUNDA ISLANDS: Bali: Vogd 2152 (Bz--17201). Banka: Teijsmann s.n. [Muntok] (Bz--17220, Bz--17222). Buton: Elfert 2701 (Le). Sumbawa: Vogd 1914 (Bz--17237). MOLUCCA ISLANDS: Amboina: Herb. Ventenat s.n. (Cb); Warburg 17522 (B, N--photo, Z--photo). Halmahera: Haan 545 [Herb. Boschproefst. BB.24925] (Bz--17204). Tanimber Islands: Buwalda 118 [Herb. Boschproefst. BB.24337] (Bz--17203). NEW GUINEA: Dutch New Guinea: Versteeg 1887 (Bz--17206, Le, Ut). Japen Island: Aet & Idjan 706 (Ng--16960). Papua: Brass 1348 (B, Bz--17205, K, P); Cavanaugh 5 (Ng--6494); A. J. Hart 4530 (Ng--6502); Jackson & Hart 4528 (Ng--6501); Womersley & Simmonds 5054 (Ng, Ng--16843). LOCALITY OF COLLECTION UNDESIGNATED: "F. S. 163 (Cl); Herb. Lamarck s.n. (Cp); Herb. Linnaeus G.813, S.4 (Is--type, Mi--photo of type, N--photo of type, Z--photo of type), G.813, S.5 (I--photo of isotype, Ls--isotype, N--photo of isotype, Z--photo of isotype); Hugel 3644 (V); Warburg 5117 [Canal bei Barria] (B), 17522 (N--photo). MOUNTED ILLUSTRATIONS: Plate 5724 (N).

AVICENNIA SCHAUERIANA Stapf & Leechman ex Moldenke, Alph. List Common Names 7, 9, 13, 19--21, 28, & 33, nom. nud. (Aug. 31, 1939); Lilloa 4: 336. Oct. 11. 1939.

Synonymy: Avicennia nitida var. trinitensis Moldenke, Phytologia 1: 96--97. 1934. Avicennia tomentosa Jacq. sensu Schau. ex Moldenke, Lilloa 4: 336, in syn. 1939 [not A. tomentosa Blanco, 1845, nor Blume, 1918, nor R. Br., 1851, nor Jacq., 1760, nor L., 1821, nor L. & Jacq., 1783, nor G. F. W. Mey., 1818, nor Nutt.,

1947, nor Nutt. & Br., 1832, nor Roxb., 1835, nor Sieber, 1844, nor Sw., 1864, nor Vahl, 1921, nor Wall., 1851, nor Weigelt, 1851, nor Willd., 1800]. Avicennia tomentosa Schau. ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Avicennia nitida var. trinitense Moldenke apud Stellfeld, Arquiv. Mus. Paran. 4: 246, sphalm. 1945. Avicennia schaueriana Leechm. & Stapf apud Pickel, Piso & Marcgrave Bot. Bras. 64. 1949. Avicennia schauerana Stapf & Leechman apud Stearn, Kew Bull. 1958: 36. 1958.

Literature: Jacq., Select. Stirp. Amer. Hist. 177--178, pl. 112, fig. 1 & 2. 1763; Vell., Fl. Flum. 6: pl. 56. 1827; Brunner, Flora 23 (1): Beibl. 20--22. 1840; Miq. in Lehmann, Plant. Preiss. 1: 353. 1845; Schau. in A. DC., Prodr. 11: 699--700. 1847; Schau. in Mart., Fl. Bras. 9: 306. 1851; Griseb., Cat. Pl. Cub. 217. 1866; Schenck, Flora 72: 83--88. 1889; Jacks., Ind. Kew. 1: 254. 1893; Wettstein, Veg. Sudbras. pl. 17 & 18. 1904; Urb. in Mart., Fl. Bras. 1 (1): 1. 1906; Warming & Vahl, Ecol. Pl., ed. Groom, 235--236. 1909; Löfgren & Everett, Sist. Analit. Pl. 162. 1910; Glaz., Bull. Soc. Bot. France 58 Mém. 3: 548. 1911; Luederwaldt, Revist. Mus. Paulista 11: 329. 1919; Luetzelburg, Estud. Bot. Nordeste 3: 224. 1923; Decker, Lebensbild. Fl. Bras. 159. 1932; Warming & Graebn., Lehrb. Oekol. Pflanzengeogr., ed. 4, 473. 1933; Houard, Zootéc. Pl. Amer. Sud 353--354. 1933; Moldenke, Phytologia 1: 96--97. 1934; F. C. Hoehne, Bot. & Agr. Bras. Sec. 16: 292, 293, 313, & 356. 1937; F. Silveira, Rodriguesia 3 (10): 145--146. 1937; Moldenke, Lilloa 4: 334 & 336. 1939; Moldenke, Geogr. Distrib. Avicenn. 10--12, 25, & 28. Sept. 20, 1939; Moldenke, Alph. List Common Names 7, 9, 13, 19--21, 28, & 33. August 31, 1939; F. C. Hoehne, Pl. & Subst. Tóx. 211. 1939; Moldenke, Prelim. Alph. List Invalid Names 5 & 6. 1940; Moldenke in Pulle, Fl. Surin. 4 (2): 323. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 215. 1940; K. Krause in Engl., Bot. Jahrb. 71: Literaturber. 41. 1940; J. A. Clark, Card Ind. issue 166. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 29, 30, 36, 41, & 86. 1942; Moldenke, Alph. List Invalid Names 5. 1942; Moldenke in Lundell, Fl. Tex. 3 (1): 11. 1942; A. Schultz, Introd. Estud. Bot. Sist. 519 & 530. 1943; Mart., Arquiv. Mus. Paran. 3: 242. 1943; Moldenke, Phytologia 2: 93. 1944; V. J. Chapm., Journ. Linn. Soc. Lond. Bot. 52: 429. 1944; Roig, Pl. Med. Cuba 449--450. 1945; Stellfeld, Arquiv. Mus. Paran. 4: 237--248. 1945; Moldenke, Alph. List Cit. 1: 9, 29, 44, 61, 65, 68, 70, 71, 78, 89, 112, 115, 117, 120, 161, 165, 170--172, 211, 215, 222, 226, 227, 236, 237, 239, & 270. 1946; Terrac, Trav. Lab. Mat. Med. 33 (3): 101. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 26. 1947; Moldenke, Alph. List Cit. 2: 334, 365, 368, 369, 413, 425, 428, 429, 433, 435, 444--446, 448, 484, 485, 501, 502, 534, 552, 566, 576, 598, 601, & 621 (1948), 3: 669, 670, 675, 684, 708, 709, 711, 737, 745, 751, 756, 772, 814, 822, 824, 847, 852, 854, 856, 890, 891, 900, 920, 922, 950, & 969 (1949), and 4: 1007--1009, 1013--1015, 1017, 1021, 1043, 1066, 1072, 1081, 1086, 1094, 1106, & 1133. 1949; H. N. & A. L. Moldenke, Pl. Life 2: 81. 1948; Moldenke, Known Geogr. Distrib. Verbenac.,

[ed. 2], 54, 56, 57, 75, 100, & 174. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 3. 1949; Pickel, Piso & Marcgrave Bot. Bras. 64 & 89. 1949; Stellfeld, Lilloa 20: 213 & 214, pl. 2, fig. 4, & pl. 3, fig. 6. 1949; Moldenke, Phytologia 3: 286. 1950; Stellfeld, Trib. Farmac. 19 (10): 170. 1951; Roig, Dicc. Bot. 2: 987. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 418-420. 1955; Moldenke, Fam. 3 Avicenn. 2-4. 1955; Cuatrecasas, Bol. Soc. Bot. Mex. 23: 94. 1958; Stearn, Kew Bull. 1958: 36. 1958; Moldenke, Résumé 61, 63, 74, 87, 118, 235, 236, 418, & 440. 1959; Moldenke, Résumé Suppl. 1: 4 & 6 (1959) and 2: 5. 1960; Reitz, Selowia 11: 74 & 89. 1959.

Illustrations: Vell., Fl. Flum. 6: pl. 56 [as A. nitida]. 1827; Wettstein, Veg. Stübras. pl. 17 & 18 [as A. tomentosa]. 1904; Stellfeld, Lilloa 20: pl. 2, fig. 4, & pl. 3, fig. 6. 1949.

Shrub or tree, to 16 m. tall, with pneumatophores; trunk to 13 cm. in diameter; branchlets and twigs slender, mostly dark-brown or nigrescent, mostly subterete, usually glabrous and shiny; petioles rather slender, 2-20 mm. long, mealy or glabrous; leaf-blades firmly chartaceous or subcoriaceous, dark-green above and decidedly brunnescent or nigrescent in drying, dull, elliptic or elliptic-ovate to oblanceolate or obovate, 1.7-8.2 cm. long, 1.1-3.8 cm. wide, mostly obtuse or rounded at the apex, entire, usually cuneate at the base or rarely merely acute or broadly rounded, mostly glabrous and densely impressed-punctate above (rarely more or less densely pulverulent), varying from densely grayish-farinaceous to glabrous and impressed-punctate beneath; inflorescence axillary and terminal, spicate, rather loose; spikes 2.5-6.5 cm. long, 1-1.5 cm. wide during anthesis, the axillary ones usually confined to a single pair at the base of the terminal one and shorter than it; flowers opposite, sparse, only 1-5 pairs per spike, sessile, the pairs usually distant, the lowest pair frequently subtended by a pair of foliaceous stipitate bracts resembling miniature leaves; bractlets and prophylla ovate, sessile, obtuse or acute at the apex, densely appressed-pubescent; flowers fragrant; calyx about 2 mm. long, equaling the corolla-tube and ovary; corolla white, the lobes spreading, subquadrant-linear or sometimes slightly wider toward the apex, about 3 mm. long and 2 mm. wide, sericeous beneath, glabrous above, the 3 anterior ones very patent or reflexed and truncate at the apex, the posterior one shorter and broader, merely spreading, retuse at the apex; stamens inserted in the throat of the corolla, not projecting beyond the mouth of the corolla-tube; filaments short; stigma sessile or subsessile, exerted, very short; ovary conic, included, sericeous, completely hidden by the closely appressed calyx after the corolla has been shed; hypocotyl almost as long as the inner cotyledon, pubescent almost its entire length, mostly without visible side-rootlets in fruit; plumule not visible to the naked eye; fruit pale sap-green, very seldom with a purple tinge, flatter, more pointed, and considerably smoother than in A. germinans.

This much misunderstood species is found in swamps and mangrove formations, the mud of tidal estuaries and seashores, along

creeks of partially salt water, in the "manguesal fluvial", and on ground sometimes covered by high-tide, from sea-level to 2 meters altitude. It is described as a "locally frequent tree" in Trinidad by Cowan & Forster. Collectors have found it blooming from January to March and in September and October, and in fruit in March, May, July, and September. Its wood is said to make good lumber and fuel.

Vernacular names recorded for what is presumably this species are "caju", "cajú", "cereiba", "ciriba preta", "ciriuba", "fromarina", "javamataia", "magae siriba", "mangue", "mangue-amarelo", "mangue branco", "mangue-branco", "mangue bráfico", "mangue canoé", "mangue conoé", "mangue seriba", "mangue seriva", "mangue siriba", "mangue-siriuba", "páo de caranguejo", "saraiba", "sireiba", "sireiba", "siriba", "siriruba", "siriuba", "siriúba", "siriúva", "siriúwa", "siruva", "white mangrove", and "white-mangrove".

The binomial, Avicennia tomentosa, has been widely used and equally widely misapplied to various species of this genus. Various authors have used homonyms credited to previous authors, who, in their estimation, had misapplied the binomial. Thus, the A. tomentosa credited to Blume is actually A. alba Blume, that credited to Blanco is A. marina var. rumphiana (H. Hallier) Bakh., that credited to Linnaeus, to Vahl, and to Wallich is A. marina (Forsk.) Vierh., that credited to R. Brown and to Sieber [Old World] is A. marina var. resinifera (Forst.) Bakh., that credited to Roxburgh and to Willdenow is A. officinalis L., and that credited to Jack, to Jacquin, to Linnaeus & Jacquin, to G. F. W. Meyer, to Nuttall, to Nuttall & Brown, to Sieber [New World], to Swartz, and to Weigelt is A. germinans (L.) Stearn. The A. tomentosa var. acutifolia of Blanchet and vars. campechensis, cumanensis, and guayaquilensis of Humboldt, Bonpland, & Kunth are A. germinans, var. arabica of Walpers is A. marina, var. asiatica of Walpers is A. officinalis, var. australasica of Walpers is A. marina var. resinifera, and var. owarensis of Walpers is A. africana P. Beauv.

Schauer, in DeCandolle's "Prodromus" and in Martius' "Flora Brasiliensis", apparently misapplied the binomial, A. tomentosa, to the plant here being discussed, and in this he has been followed blindly by numerous later authors. In 1917, however, Alleyne Leechman made careful observations on the mangroves near Georgetown, British Guiana, and sent a series of specimens to Kew. Otto Stapf studied this material and prepared a lengthy memorandum which he never published, but which Stearn has quoted in part in the Kew Bulletin for 1958. This memorandum is well worth publishing in its entirety here for the information of future workers on the genus:

"Avicennia. The two forms collected by Mr. Leechman are (a) A. nitida and (b) A. tomentosa, as understood in Flora Brasiliensis.

"(a) A. nitida. Jacquin's A. nitida from Martinique has leaves which in outline and size (see his fig. in Select. Stirp. Amer. Hist. tab. 112) are very like those of no. 8 of Mr. Leechman's set, but according to the description which is borne out by Jacquin's own specimen (in the British Museum collections) they are glabrous and shining on both sides and not whitish papillose-tomentose underneath. We have a similar form from 'Brazil' (Rio de Janeiro?) Sellow, and Pernambuco, Gardner 1101, and slightly less pronounced from Surinam (Hostmann, 457). In all these specimens there are younger leaves present which are whitish underneath with the tomentum characteristic of and usually persistent in this species. Gardner says that his specimens were taken from 'a very large tree'. It would be interesting to know whether this ultimately glabrescent form represents a definite race or an age state. To judge from the very ample material of A. nitida, American and African (A. africana = A. nitida), which I have seen, I am inclined to see in it a race, characterized by the ultimately complete glabrescence of the leaves (or at least the first leaves of a season's growth). I wonder whether Mr. Leechman has come across it and can throw any light on it. His observation that the varying leaf-forms of A. nitida are connected with ecological conditions is highly interesting and important. Several more forms could be added from our collections; but are they not also in part connected with age and racial differentiation? Until we know more about these matters, it will be sufficient to treat all these forms simply as A. nitida, qualifying the term if desirable, by the addition of 'foliis lanceolatis acutis' or 'f.....oblongis obtusis' etc. or their English equivalents.

"(b) A. tomentosa, Jacq. The application of this name by authors generally is highly conflicting and very unsatisfactory. This is mainly due to Jacquin's very meagre account of the species and his figure of a single leaf on tab. 112 of his Select. Stirp. Amer. Hist. His diagnosis (l.c. p. 177) runs 'foliis subtus tomentosis' to which he adds a number of synonyms and this description 'Arbor vigintipedalis vel altior, habitu prorsum praecedentis. Folia ovato-oblonga, obtusa, facie glabra et virentia, dorso vestita tomento denso tenuissimo ac incano, petiolis crassis'. Finally he states 'Habitat in plerisque Caribaeis & in Continentvicina'. The figure quoted represents a leaf which might be described as ovate-elliptic, very obtuse at the apex and slightly cordate at the base, 8 cm. by 4.5 cm., with a stout petiole, 5 mm. long. Now there is a leaf on a sheet of Jacquin's in the collection of the British Museum which answers this drawing exactly apart from the base which is broadly rounded, not cordate -- that is the basal curve of the leaf meets the petiole without forming a sinus at all. The resemblance is indeed so great that it may be assumed to be the very leaf from which the drawing was made. The texture, colour, and tomentum of the leaf is exactly that of the common form of A. nitida.

The same leaf-shape is represented in a specimen in the Kew Herbarium, collected by J. R. Johnston in the island of Sa. Margarita off the Coast of Cumana -- except that the leaves are somewhat smaller, the largest measuring 7 cm. by 4.5 cm. -- and also in the form described by Kunth (in Humb. & Bonpl. Nov. Gen. ii. 283) as A. tomentosa var. cumanensis from the coast of Cumana ('foliis oblongis aut elliptico-oblongis, utrinque rotundatis, brevissime petiolatis'). Thus there is sufficient evidence to show that Jacquin meant by his A. tomentosa a state of A. nitida with obtuse and rather broad, underneath whitish leaves and that he figured an extreme form corresponding to Kunth's var. cumanensis. This is confirmed by his quotations excepting the last 'Oepata, Rheed. Mal. 4. p. 95, t. 45' which belongs to A. officinalis L. (emend.), an exclusively Indo-Malayan species. Of his quotations those from Brown and Sloane can be connected with well preserved specimens which represent the common narrowly oblong-leaved A. nitida of Jamaica, whilst that from Loeffling points to a plant having 'folia.....lanceolata.....acuminata triuncialis...infra glauco-incana', evidently also one of the common forms of A. nitida. Comparing Jacquin's own specimens of A. nitida and A. tomentosa meagre as they are and representing such extreme forms one is not surprised that he saw in them distinct species. Whether he ever came across the 'A. tomentosa' of Schauer (Flora Brasiliensis) is more than doubtful. The smaller flowers with their inside glabrous corollas and short styles would have struck him as distinct from those of A. nitida which he figures correctly. This 'A. tomentosa Schauer, non Jacq. nec aliorum' has no name, and the only synonym which I find quoted for it, namely A. elliptica, Holm (erroneously attributed to Thunberg) from Brazil is in all probability A. nitida. It is described as having elliptic, acuminate leaves, a span long and almost an inch wide, such as occur frequently in Brazilian and Guiana specimens. It seems to me that Schauer having given first a correct description of this plant, A. Schaueriana would be a convenient and appropriate name for it."

Thus Mr. Leechman's Avicennia would be referable to A. nitida, Jacq. and A. Schaueriana, Stapf & Leechman, if Mr. Leechman will allow me to join his name to mine."

The notes by Mr. Leechman referred to by Stapf are in a letter from him dated February 24, 1917, from Queens College, Georgetown, British Guiana, which reads as follows:

"At only one spot in the strip of coast which I have had under observation for the last two years have I found anything which could be identified as A. tomentosa. In this cove two distinct varieties of Avicennia are certainly present, and the differences between them are most obvious when they are young. In addition to the broad leaves and sessile stigmas other points of difference from the typical A. nitida are:- a) stamens not projecting beyond mouth of corolla-tube, b) inflores-

cence less 'condensed', c) fruit pale sap-green, very seldom with a purple tinge, d) fruit flatter and more pointed than in A. nitida - also considerably smoother, e) corolla-lobes not reflexed.

"In A. nitida the fruit frequently turns almost plum-coloured where exposed to the sun, and the corolla-lobes are finally completely bent back till they touch the tube, when the blackened anthers and the projecting bi-lobed stigma become very conspicuous.

"Unfortunately Avicennia is a very variable plant. The condition in which it grows may change from fresh to highly saline, and the change affects the tree considerably. Sheets 14, 15, and 16 illustrate this, and I hesitate to express an opinion on the validity of the suggested species tomentosa in the light of my experience. I have not yet found a full-grown tree showing the tomentosa characters, and even seedlings which begin as typical tomentosas will change so materially as a result of a change in their environment (drying up of pool, invasion by sand, and what not) that they become 'doubtful'. In saplings up to 10-12 feet high, growing in uniform and favorable conditions ('sling mud' constantly wet) the tomentosa characters are often quite typical, and I am naturally keeping these plants under close observation."

Schauer's original description of "Avicennia tomentosa Jacq." in A.DC., Prodr. 11: 699-700 (1847) is "foliis obovato-ellipticis, obtusissimis, in petiolum attenuatis, supra demum subnitidis, subtus candicantibus (aetate interdum glabrescentibus); spicis brevibus, basi plerumque interruptis; corollae lobis patentissimis, subquadrato-linearibus, truncatis, postico breviori retuso, omnibus subtus sericeis, supra glabris; germine incluso, conoideo, sericeo; stigmatibus subsessilibus."

In my discussion of the family in "The Flora of Trinidad and Tobago" (1955) I have keyed out the two east coast species as follows:

1. Corolla-lobes tomentose on both surfaces; leaf-blades usually sharply acute at the apex.....A. germinans.
- 1a. Corolla-lobes glabrous above; leaf-blades usually rounded at the apex.....A. schaueriana.

The editor as assigned to the former the common name of "Black mangrove" and to the latter the name of "White mangrove", which is apparently the usual application of these names in Trinidad and Tobago. In the United States, however, the name "White Mangrove" is usually applied to Laguncularia racemosa Gaertn. f., in the Terminaliaceae.

Stellfeld, on page 245 of his 1945 publication, cited above, has this to say about the key given above (given by me also in Lilloa 4: 334. 1939): "Esta maneira de diferenciar a espécie, deixou-nos durante algum tempo atrapalhados, desde que, mais adiante, descobrindo propriamente a planta, disse que 'as flores assemelham-se às da espécie precedente, contudo os lobos da corola são glabros interiormente', parecendo assim que a corola devia ser completamente lisa: interiormente e em cima,

ou seja a parte exterior, quando na realidade Moldenke queria se referir na posição da flor desabrochada, quando os lobos, respectivamente a parte interna dos lobos fica voltada para cima, mostrando-se desta maneira glabra, enquanto que a parte externa e agora inferior apresenta-se revestida de pêlos. Desde que empregou expressões diferentes na chave e na descrição, seria preferível anotar a presença de pêlos em ambas as faces dos lobos da corola (A. nitida) e apenas na face externa (A. Schaueriana)."

On the following page he makes these comments about the ranges of the two species and their common names in Brazil: "E quanto a distribuição geográfica, para a primeira espécie: desde a parte meridional dos Estados Unidos, através as Bermudas, as Bahamas e as Índias Ocidentais, ambas as costas do México e América Central, até as costas da Colômbia, Equador, Péru, Venezuela, as Guianas e o Brasil, e também as ilhas de Galapagos. E para a segunda: desde a Martinica e Granada até o Brasil meridional e Uruguai. Como se vê, embora bem definidas as espécies, no que diz respeito à distribuição pelo Brasil tudo muito vago, dando contudo a entender que a A. nitida é encontrada no Brasil (possivelmente não em toda a costa) e a A. Schaueriana até o Brasil meridional. E relativamente aos nomes vulgares novas controvérsias: black-mangrove a A. nitida e ciriba-preta a A. Schaueriana, que também tem o nome de mangue-branco, o que não é possível." on page 247 he says "Consideramos esta coleta a mais preciosa de todas e seguindo as descrições de Moldenke, então disponíveis, pudemos nos certificar que se tratava da Avicennia Schaueriana (Museu Paranaense, 1799), que se diferencia ainda da A. nitida pela inflorescência: espigas com 1--5 pares de flores para a primeira e 1--15 pares a segunda. Sentimos também o mesmo aroma de mel, tal como havia percebido Marcgrave, exalado pelas pequenas flores brancas e lembrando o da magnólia. Incontestavelmente duas são as causas principais do imperfeito conhecimento destas duas Avicennias em terras brasileiras: a dificuldade em ser atingido o seu habitat e a possibilidade ou não de ser encontrada florescida."

Stearn, in the publication cited above (1958), separates the two species as follows:

1. Leaves mostly acute at the apex; corolla-lobes tomentose on both surfaces; style elongated.....A. germinans.
- 1a. Leaves mostly rounded at the apex, sometimes acute; corolla-lobes glabrous inside, tomentose outside; style very short, the stigma hence almost sessile.....A. schaueriana.

He gives the "Restricted type-locality" as Brazil. The cotype collections, therefore, would be the Brazilian collections cited by Schauer in A. DC., Prodr. 11: 699--700 (1847). These are Blanchet 1427, Martius 108, Salzmann 430, Gaudichaud s.n., Pohl s.n., and Riedel s.n., from Rio de Janeiro and "Soteropolis".

I regret that I cannot agree with my friend Stearn in his "correction" of the specific epithet of this species to "schauerana". I have given my opinion several times elsewhere

[e.g., Fedde, Repert. Spec. Nov. 41: 142. 1936; Moldenke, Résumé 418. 1959] as to the undesirability of "correcting" the spelling of scientific names. In this case, Stapf's original proposal was "schaueriana". The original valid publication was also thus. Up to the time of Stearn's proposal the name had been spelled "schaueriana" 183 times in botanical publications (15 times in 1939, 3 times in 1940, 10 times in 1942, once in 1944, 6 times in 1945, 36 times in 1946, once in 1947, 34 times in 1948, 73 times in 1949, once in 1950, once in 1951, and twice in 1955). In addition, it has been spelled thus on 247 formal printed and type-written annotation labels placed on herbarium specimens and mounted illustrations in 40 different herbaria in Austria, Belgium, Brazil, Canada, Denmark, England, France, Germany, Netherlands, Scotland, Sweden, Switzerland, Trinidad, United States, and Uruguay. I see no valid reason for changing the spelling now.

The type of A. nitida var. trinitensis was collected by R. L. Brooks [Herb. Trinidad Botanical Garden 12656] in the Caroli swamp, Trinidad, on May 29, 1932, and is deposited in the Britton Herbarium at the New York Botanical Garden. Most of the Trinidad material of this species has entirely glabrous leaves, but Herb. Trin. Bot. Gard. 2402 and 8695 show the typical pubescence of A. germinans; all have a rounded leaf-apex.

It is worthy of note that while Schauer's description of "A. tomentosa Jacq." actually applies to A. schaueriana, some of the specimens which he cites (viz., those from Mexico, Florida, the West Indies, Venezuela, and Ecuador) are A. germinans.

The Moll specimen cited below was probably collected by Von Rohr in either Martinique or Trinidad. West Indian specimens accredited to Moll in the Martius Herbarium were not collected by him since he severed connection with the expedition of which he was a part before it went to the West Indies. The collector's name "Salzmann" is misspelled "Saltzmann" in the Paris herbarium.

The label of Andersson 82 is inscribed "Monte Video. M. Anderson no. 82", but my good friend and colleague, Dr. Herter, told me shortly before his death that as far as he was aware Andersson never collected in Uruguay. Urban, however, in Mart., Fl. Bras. 1 (1): 1 (1906) states that Andersson went from Rio de Janeiro to Montevideo and then on to Buenos Aires, the Straits of Magellan, the Galapagos Islands, Hawaii, Australia, and Cape of Good Hope. Therefore, I see no reason to doubt the accuracy of the label. The label on Glaziou 11323, on the other hand, is inscribed "Rio de Janeiro", but the material was actually collected at Itapemirim, near the sea, in Espirito Santo, according to Glaziou's own notes in Bull. Soc. Bot. France 58 Mém. 3: 548 (1911). It was misidentified by him, with a question, as A. africana P. Beauv. Several collections (viz., Broadway & Alexander s. n., Herb. Trin. Bot. Gard. 5405, Gooding 553) have been misidentified as Laguncularia racemosa in herbaria. Mostly, however, the species has been confused with and misidentified as A. nitida.

It has been recorded [as A. tomentosa Jacq.] by Luetzelburg, in the reference cited above, from Areia Branca in Rio Grande do Norte and from Cajú and Ilha Grande in Rio de Janeiro. Chapman, in the reference also cited above, says "A. tomentosa Jacq., which is distinguished from A. nitida by broader leaves and subsessile stigmas, is said to grow in a few Caribbean islands, and though recorded from Jamaica it was not seen in the vicinity of Kingston."

Houard reports that this plant is often infested by the insect, Erineum croceum Fée, in Guiana, and by an undetermined species of eriophide in Brazil and by an undetermined species of cecidomide, also in Brazil, all causing galls. The lichen, Polyblastia sp., has been found on its stems.

In all, 233 herbarium specimens, including some of the original cotypes and types of all the names involved, and 14 mounted photographs and illustrations have been examined.

Citations: WINDWARD ISLANDS: Barbados: E. G. B. Gooding 553 (Bm). Grenada: W. E. Broadway s.n. [Woburn, St. George's swamp, March 17, 1905; Hort. Thenensis 14508] (Br, E--photo, N, N--photo, Z--photo). Martinique: Plée s.n. (B). TRINIDAD: N. L. Britton 2595 [Herb. Trin. Bot. Gard. 9516] (R), 2595 [Herb. Trin. Bot. Gard. 10461] (N, R); W. E. Broadway 5817 (Ca--384277, Ca--415983, E--926140, F--699857, I); Broadway & Alexander s.n. [Herb. Trin. Bot. Gard. 5221] (B, R); R. L. Brooks s.n. [Herb. Trin. Bot. Gard. 12656] (N, R); Cowan & Forster 1252 (Z); W. G. Freeman s.n. [Herb. Trin. Bot. Gard. 7988] (R); Herb. Trin. Bot. Gard. 2402 (R), 5405 (B); R. C. Marshall s.n. [Herb. Trin. Bot. Gard. 12651] (N, R); R. O. Williams s.n. [Herb. Trin. Bot. Gard. 8695] (R). PATOS: Britton, Hazen, & Mendelson 541 (N, W--1047019). WEST INDIES: Island undesignated: Moll s.n. [Herb. Martius; Ind. occid.] (Br, N--photo, S--photo, Z--photo). BRITISH GUIANA: Leechman s.n. [near Georgetown, 1917] (N, N, Ut--70549a). BRAZIL: Bahia: Blanchet 1427 (Cb--cotype), 1477 (P); Herb. Reichenbach f. s.n. (V); Luetzelburg 401 (Mu, Mu, N--photo, V, V, Z--photo), s.n. [VIII, 1912] (Mu, N--photo, Z--photo); Martius 2148 (Mu--1083), s.n. [in maritimis prov. Bahiensis, 1819] (Mu--1690), s.n. [Soteropolis & Ilheus] (Mu--1082); Salzmann s.n. [1831] (Cb, Ed), s.n. (K, K, P). Ceará: Dias da Rocha 108 (N, Sp--7933); Drouet 2548 (E--1110545, F--857467, F--949348, N, S). Espirito Santo: Glaziou 11317 (B, Br, Cb, Cp, K, N, P, P, S). Federal District: A. Lutz 817 [Herb. Lutz 817] (Ja); Moldenke & Moldenke 19606 (F, Mg, Mr, N, No, Ot, S, Sm, Ss). Florianopolis Island: Rambo 50320 (Im, N, S). Maranhão: Fróes 1812 (B, Bm, Cb, Cb, E--1042134, F--707083, I, K, Mi, N, P, S, Ut, W--1660151). Paraíba: Luetzelburg 12521 (Mu). Paraná: Dusén 212 (S), 11418 (B, Cb, W--1481835), 11418a (S), s.n. [Herb. Rio de Jan. 5004] (N); Hatschbach 1920 (N); Stellfeld 799 [Herb. Mus. Paran. 1799] (N). Pernambuco: Ridley, Lea, & Ramage s.n. [Aug. 4, 1887] (Bm); Sobrinho 251 (It, N, Ug). Rio de Janeiro:

Andersson s.n. [1857] (S); Banks & Solander s.n. [1768] (Bm); Collector undesignated 6 (C), s.n. [1835] (P), s.n. [Sebastianopolis] (C); Commerson 231 (P); Dusen 202 (S, W—1055656); Forsell 202 (S); G. Gardner 98 (Bm, Cb, K, S); Gaudichaud 264 (P), 464 (B, Br, Cb, Dc, N), s.n. [Rio Janeiro] (B—cotype, V—cotype); Ginzberger & Zerny s.n. [Manguinho] (V); Glaziou 1362 (Br, Br, Br, Br, Cp, Cp, F—667195, It, K, N, P), 11323, in part (B); Hemmen-dorff 442 (S); Herb. Rio de Jan. 31572 (N), 31775 (N), 32261 (Ja); F. C. Hoehne s.n. (N, Sp—24908); Kaempfe 363 (B); Luetzelburg 16058 (Mu), 16059 (Mu), 16077 (V), s.n. [XII.1910] (Mu, N—photo, Z—photo); Luschnath s.n. [Herb. Martius 108] (Br—cotype, Dc—cotype, K—cotype, M—cotype, Mu—1081—cotype, P—cotype, V—cotype); Martius s.n. [prope Rio de Jan.] (Mu—1084); Miers s.n. (Bm); Patschke 188 (B); Pohl 6141 (F—874771); Pohl & Schott 6141 (V); Regnell s.n. [1835] (Cb); A. Richard 2143 (S); Riedel & Luschnath 1007 (N); Saint-Hilaire A'267 (K, P, P, P, P, P); Schenck 2074 (B), 3830 (B, N); Sellow 304 (N), 304b (B); Ule s.n. [Herb. Rio de Jan. 32260] (Ja); United States Expl. Exped. [Wilkes] s.n. (T, W—59278, W—59279); Vauthier s.n. [1836] (P); Warming s.n. (Cp). Rio Grande do Norte: Ginzberger & Zerny s.n. [Natal] (V). Santa Catarina: Reitz 5525 (N); Reitz & Klein 683 [Herb. Barb. Rodr. 6961] (N, S, W—2123175), 1183 (S, W—2142517), 1414 (W—2142574); Schenck 1225 (B, B); Tweedie s.n. (K); Ule 3884 (B). Santa Catarina Island: Reitz 5088 [Herb. Barb. Rodr. 6323] (N, N). São Paulo: Gaudichaud 275 (P); F. C. Hoehne s.n. (It, K, N, N, Sp—30854, Sp—30854); Ilien s.n. [Santos, 12/1914] (Us); Jönsson s.n. [Santos, XII.1914] (Lu, Lu); Löfgren s.n. [Herb. Geogr. & Geol. 3062] (N, Sp—15596); Mosén 3450 (S, S, S); F. Noack 18 (N); Pickel 3210 (It, N, Sf); Saint-Hilaire C².7665 [1665] (N, P); Usterl s.n. (N, Sp—15598). State undetermined: Burchell 1105-105 (K); Caminhao s.n. (V); Collector undesignated s.n. (V, V, V); Glocker s.n. (Bm, S); Riedel & Sellow s.n. (S); Sellow s.n. [Brasilia] (B, Bm, Bm, N, P, P, Vt); Vidal s.n. [Herb. Rio de Jan. 31546] (N). URUGUAY: Andersson 82 (Cb). MOUNT-ED ILLUSTRATIONS: Vell., Fl. Flum. 6: pl. 56. 1827 (Cb, S).

AVICENNIA TONDUZZII Moldenke, Phytologia 1: 273—274. 1938.

Synonymy: Avicennia tonduzzi Cuatrecasas, Bol. Soc. Bot. Mex. 23: 94. 1958.

Literature: Moldenke, Phytologia 1: 273—274. 1938; Standl., Field Mus. Publ. Bot. 18: 998—999. 1938; Moldenke, Geogr. Distrib. Avicenn. 17. 1939; Moldenke, Alph. List Common Names 23. 1939; J. A. Clark, Card. Ind. issue 160. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 23, & 86. 1942; Moldenke, Phytologia 2: 93. 1944; Moldenke, Alph. List Cit. 1: 58 & 301. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 26. 1947; Moldenke, Alph. List Cit. 2: 340, 341, 346, 389, 416, 436, & 437 (1948), 3:

817, 818, & 978 (1949), and 4: 999, 1000, 1025, 1026, 1059, & 1243. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39, 41, & 174. 1949; Cuatrecasas, Bol. Soc. Bot. Mex. 23: 94. 1958; Moldenke, Résumé 46, 49, 65, & 440. 1959; Moldenke, Résumé Suppl. 1: 15. 1959.

Tree, to 11.5 m. tall; branchlets and twigs slender, obtusely tetragonal or subterete, jointed, the youngest parts densely matted-tomentellous with flavidous puberulence, the older parts less densely puberulent with gray or cinereous-sordid or, at least, not so pronouncedly flavidous, hairs, or even glabrate, the youngest parts wrinkled in drying, the nodes swollen and annulate; principal internodes 0.7—4.5 cm. long; leaf-scars very conspicuous; leaves decussate-opposite, numerous; petioles slender or stoutish, 0.8—2 cm. long, densely appressed-puberulent or matted-tomentellous with very minute hairs like the twigs, not noticeably ampliate at the base, mostly wrinkled in drying or wrinkled-striate; leaf-blades coriaceous, bright-green and somewhat shiny above, gray beneath, oblong or elongate-oblong to elliptic, 7.3—17 cm. long, 1.6—4.8 cm. wide, obtuse or blunt to subacute at the apex, entire, acute or subacuminate to acuminate or long-attenuate at the base and prolonged into the petiole, densely and very minutely pulverulent and impressed-punctate above, becoming glabrescent in age, uniformly very densely matted-tomentellous beneath with closely appressed, minute, cinereous or sordid to flavidous hairs like the twigs; midrib slender, flat and deeply canaliculate above from the base to about $2/3$ the length, then rounded-prominent to the apex, rounded-prominent beneath; secondaries very slender and numerous, 15 or more per side, not much different from the larger veins which almost parallel them, plainly anastomosing at the very margins on both surfaces in an almost straight line, prominent on both surfaces; vein and veinlet reticulation sparse, the larger portions prominent on both surfaces; inflorescence axillary and terminal, cymose, paniculate, 3—6 cm. long and wide, usually regularly several-branched from the very base, the branches many-flowered, the axillary ones crowded in the uppermost axils, 2—3 cm. long and 1—2 cm. wide, the terminal ones 3—5 cm. long and 3.5—4 cm. wide; peduncles, rachis, and branches of the inflorescence densely matted-tomentellous and wrinkled-striate like the petioles; bractlets ovate, a pair subtending each pair of inflorescence-branches; flowers sessile; prophylla 3, ovate, about 2 mm. long and 1.5 mm. wide, strigose at the center on the back, villous-tomentose toward the margins, rounded or obtuse at the apex, simulating sepals and closely appressed to them, imbricate; sepals 5, separate, imbricate, broadly elliptic or subrotund, about 2.5 mm. long and wide, rounded at the apex and base, densely villous-tomentose on the back; corolla hypocrateriform, its tube broadly cylindric, short, straight, about 1 mm. long, glabrous on both surfaces, its limb 4-parted, the lobes equal, wide-spreading during anthesis, narrowly elliptic-lingulate, about 3 mm. long and 1.5 mm. wide, rounded at the apex, densely tomentose on both surfaces; stamens 4, inserted about 0.5 mm. above the base of the corolla-

tube, equal, exserted; filaments slender, about 1.5 mm. long, glabrous; anthers oblong, about 0.75 mm. long and 0.375 mm. wide, 2-celled, not appendaged, opening by longitudinal slits; pistil 1, compound, 2-carpellary; ovary ovate-subglobose, about 1.25 mm. long and wide, densely appressed-villous with antrorse hairs, not lobed, incompletely 4-celled; style terminal, comparatively stout, about 0.75 mm. long, densely appressed-villous; stigma bifid, its branches about 0.25 mm. long, unequal; ovules borne on a basal 4-winged placenta, pendent.

The type of this species was collected by Adolfe Tonduz (no. 6776) — in whose honor it is named — in the littoral zone bordering the Pacific Ocean at Punta Mala, Puntarenas, Costa Rica, in March, 1892, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. Material of what appears to be the type collection is often found in herbaria with labels reading "Pittier 6776". Tonduz 6775 [Pittier 6775] is certainly topotype material and may possibly also be part of the original type collection. Tonduz 6775 in the British Museum herbarium was annotated "Avicennia sp. n. O. S[tafp]" by Stapf when he was revising the American members of the group. The Brussels sheet of Herb. Inst. Physico-geogr. Nat. Costaric. 10060 has a large gall on one branchlet. A common name is "palo de sal". Stork says the plant is "common in mud flats, forms evergreen mat". Core describes it as a tree 35 feet tall, "associated with mangrove (feliz) along coasts of Pacific Ocean at mouth of Buenaventura". It has been collected in anthesis in March, April, and November, and has been widely misidentified as A. nitida Jacq. Standley says "similar to A. nitida, of which it may be only a form or variety, but differing in its somewhat smaller flowers." In all, 38 herbarium specimens, including the type, and 4 mounted photographs have been examined.

Citations: COSTA RICA: Puntarenas: Brenes 12222 [101; 701] (F--855888); H. Pittier 6775 (Br), 6776 (Br--type, N--photo of type, Z--photo of type), 7109 [Herb. Inst. Physico-geogr. Nat. Costaric. 10060] (Bm, K, Mu--3828, W--355403, W--1323378), 7110 [Herb. Inst. Physico-geogr. Nat. Costaric. 10066] (Bm, E--118578, F--76860, K, Mu--3835, N, N--photo, W--355404, W--1323377, Z--photo); Stork 4036 (Du--252414); Tonduz 6775 (Bm, N), 6776 (Mu--4053--isotype, P--isotype, W--1323382--isotype), 10060 (Bm, P, P), 10066 (Bm, P), s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 10060] (Br, Mu--3787, W--391998, W--1323381), s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 10066] (Br, Br, W--1323380). TABOGA ISLAND: H. Pittier 3614 (N). COLOMBIA: Valle del Cauca: E. L. Core 1569 (Le, N, N).

AVICENNIA AFRICANA P. Beauv.

Additional literature: Moloney, Sketch Forest. W. Afr. 524. 1887.

AVICENNIA ALBA Blume

Sørensen, Larsen, & Hansen describe the cortex as black.

Additional citations: KOH CHANG ISLAND: Sørensen, Larsen, & Hansen 7099 (Cp). THAILAND: Floto 7832 (Z); Sørensen, Larsen, & Hansen 537 (Cp), 2016 (Z).

AVICENNIA MARINA (Forsk.) Vierh.

The Sørensen, Larsen, & Hansen 120 specimen cited below has a broad leaf-miner tunnel in one of its leaves.

Additional citations: KOH CHANG ISLAND: Sørensen, Larsen, & Hansen 120 (Cp), 7098 (Cp). THAILAND: Floto 7820 (Z).

AVICENNIA OFFICINALIS L.

Additional literature: Sim, For. Fl. Cape Col. 287, pl. 120, fig. 3. 1907.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS STYLODON

Harold N. Moldenke

This is the twenty-third in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated were Aegiphila Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithammus Miers, Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed for the names of the 255 herbaria whose material was examined in the preparation of these works and of the present paper will be found in Phytologia 5: 154—159 (1955), 6: 242 (1958), and 7: 91—92 & 123—124 (1960), with the following addition:

Gp = Ontario Agricultural College, Guelph, Ontario, Canada

STYLODON Raf., Neogenyt. 2. 1825.

Synonymy: Styleurodon Raf., Fl. Tellur. 2: 104. 1836.

Literature: Medic., Bot. Beobacht. 1783: 131. 1784; Walt., Fl. Carol. 166. 1788; Michx., Fl. Bor.-Am. 2: 14. 1803; Steud., Nom. Bot., ed. 1, 1: 873. 1821; Raf., Neogenyt. 2. 1825; Raf., Fl. Tellur. 104. 1836; Steud., Nom. Bot., ed. 2, 750. 1840; Schau. in A. DC., Prodr. 11: 545. 1847; A. W. Chapm., Fl. South. U. S., ed. 1, pr. 1, 307. 1860; A. Wood, Class-book, pr. 1, 537 (1861) and pr. 2, 537. 1863; A. W. Chapm., Fl. South. U. S., ed.

1, pr. 2, 307. 1865; A. Wood, Class-book, pr. 3, 537 (1867), pr. 4, 537 (1868), and pr. 5, 537. 1869; A. W. Chapm., Fl. South. U. S., ed. 1, pr. 3, 307 (1872), ed. 2, pr. 1, 307 (1884), and ed. 2, pr. 2, 307. 1889; Jacks., Ind. Kew. 2: 504 (1894) and 2: 1011, 1012, & 1178. 1895; A. W. Chapm., Fl. South. U. S., ed. 3, 368—369. 1897; Earle, Bull. Ala. Agr. Exp. Sta. 119: 101. 1902; Small, Fl. Southeast. U. S., ed. 1, 1009 (1903) and ed. 2, 1009. 1913; Britton & Br., Illustr. Fl., ed. 2, 3: 95. 1913; Seymour, Host Ind. Fungi N. Am. 587. 1929; Moldenke, List Spec. Mold. Southeast. Set 10. 1930; Perry, Ann. Mo. Bot. Gard. 20: 309. 1933; Small, Man. Southeast. Fl. 1135 & 1508. 1933; Briq., Internat. Rules Bot. Nomencl., ed. 3, 24. 1935; Britton & Br., Illustr. Fl., ed. 2 rev., 3: 95. 1936; Moldenke, Rev. Sudam. Bot. 5: 2. 1937; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Moldenke, Annot. List 108. 1939; Moldenke, Geogr. Distrib. Avicenn. 1—3. 1939; Moldenke, Prelim. Alph. List Invalid Names 36, 42, & 45. 1940; Moldenke, Suppl. List Invalid Names 1 & 8. 1941; Worsdell, Ind. Lond. Suppl. 2: 422. 1941; Moldenke, Alph. List Invalid Names 7, 36, 43, & 46. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 47—48. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 4—6, 12, & 100. 1942; Murrill, Guide Fla. Fl. 46. 1945; Moldenke, Am. Journ. Bot. 32: 609. 1945; Moldenke, Alph. List Cit. 1: 13, 15, 31, 38, 42, 77, 81, 91, 99, 103, 118, 129, 138—140, 175, 191, 195, 197, 203, 211, 234, 239, 240, 262, 267, 276, 291, & 293—296. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 18, 23, & 28. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 30. 1948; Moldenke, Castanea 13: 121. 1948; Moldenke, Alph. List Cit. 2: 391, 393, 413, 438, 454, 467, 469, 471, 479, 510—513, 519, 545, 559, 568, 576, 585, 617, 630, & 632 (1948), 3: 658, 660, 683, 698, 699, 721, 741, 742, 750, 755, 759, 776, 778, 789, 798, 835, 841, 842, 850, 880, 898, 939, & 942 (1949), and 4: 990, 998, 1003, 1107, 1110, 1112, 1118, 1141, 1177, 1181, 1192, 1198, 1210, 1228, & 1238. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 7, 8, 10, 11, 18, 23, 163, & 196. 1949; Moldenke, Am. Wild Fls. 293, 446, & 450. 1949; Moldenke, Phytologia 3: 72, 131, & 132. 1949; Fern. in A. Gray, Man. Bot., ed. 8, 1209, 1211, & 1612, fig. 1467. 1950; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 126. 1952; Thorne, Am. Midl. Nat. 52: 313. 1954; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 2, 3: 126. 1958; Moldenke, Résumé 10, 11, 13—15, 23, 28, 222, 240, 334, 350, 361, 365, 378, 405, & 470. 1959; Moldenke, Résumé Suppl. 1: 2 (1959) and 2: 11. 1960.

Illustrations: Small, Man. Southeast. Fl. 1135. 1933.

Cinereous-pubescent perennial herbs with simple or sparingly branched tetragonal stems; leaves simple, opposite, exstipulate, sessile, the blades net-veined, serrate, scabrous above; inflorescence centripetal (racemose), in elongate inconspicuously bracteate spikes; flowers hypogynous, perfect, complete, zygomorphic; calyx gamosepalous, tubular-campanulate, 5-costate, its rim sharply 5-lobed; corolla gamopetalous, colored, rarely white, salverform, its limb unequally 5-lobed; stamens 4, in-

serted at or above the middle of the corolla-tube, included, didynamous; filaments extremely short; anthers unappendaged, 2-celled, the thecae parallel; pistil one, included; style short; stigma very shortly 2-lobed, the larger lobe stigmatiferous, the smaller one tooth-like; ovary 4-celled, each cell 1-ovulate; ovules erect; fruit nut-like, ridged, with 4 broad plane surfaces at the top which form a cap-like beak; cocci 4, not readily separating.

This is a monotypic genus of the southeastern United States. The type species is Phryma caroliniensis Walt. [= Stylodon carneus (Medic.) Moldenke]. The generic name was proposed as neuter by Rafinesque, but under Article 72 (2) of the International Rules of Botanic Nomenclature — cited under Briquet above — all generic names ending in -odon are to be masculine in gender.

In Lundell, Fl. Texas 3 (1): 47 (1942) the page citation for the original publication of Styleurodon Raf. is given as "14" — this is a typographic error for "104".

The genus is closely related to Verbena L. In Stylodon the fruit is nutlet-like and beaked, with the cocci not readily separating, while in Verbena the fruit is schizocarpous, not beaked, and the cocci are easily separable when ripe.

STYLODON CARNEUS (Medic.) Moldenke, Rev. Sudam. Bot. 5: 2. 1937.

Synonymy: Verbena carnea Medic., Bot. Beobacht. 1783: 131. 1784. Phryma caroliniensis Walt., Fl. Carol. 166. 1788. Verbena caroliniana Michx., Fl. Bor.-Am. 2: 14. 1803 [not V. caroliniana L. ex Schau., 1847, nor Murr., 1774, nor Spreng., 1847, nor Willd., 1798]. Stylodon scabrum Raf., Neogenyt. 2. 1825. Verbena caroliniana L. ex Raf., Neogenyt. 2, in syn. 1825. Phryma caroliniana Walt. ex Raf., Neogenyt. 2, in syn. 1825. Styleurodon carolinianum Raf., Fl. Tellur. 2: 104. 1836. Verbena caroliniana Medic. ex Steud., Nom. Bot., ed. 2, 750. 1840. Verbena caroliniana Hort. ex Schau. in A. DC., Prodr. 11: 545, in syn. 1847. Verbena carolinensis (Walt.) J. F. Gmel. ex Small, Fl. Southeast. U. S., ed. 1, 1009. 1903 [not V. carolinensis Dill., 1847]. Verbena carolinensis Small apud Perry, Ann. Mo. Bot. Gard. 20: 309, in syn. 1933. Stylodon carolinensis (Walt.) Small, Man. Southeast. Fl. 1135 & 1508. 1933. Phryma carolinensis Walt. apud Small, Man. Southeast. Fl. 1135, in syn. 1933. Buchnera carolinensis (Walt.) Gmel. ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Verbena caroliniensis (Walt.) J. F. Gmel. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena carolinensis (Walt.) Small ex Moldenke, Alph. List Invalid Names 46, in syn. 1942. Verbena carolinense (Walt.) Gmel. ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena verticifolia L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 28, in syn. 1947. Verbena carolinensis Gmel. ex Moldenke, Résumé 361, in syn. 1959. Verbena carolinianum L. ex Moldenke, Résumé 361, in

syn. 1959. Verbena verbenaeifolium Michx. ex Moldenke, Résumé 378, in syn. 1959. Verbena hastata x stricta Ravenel ex Moldenke, Résumé 365, in syn. 1959 [not V. hastata x stricta Allen, 1958, nor Anderson, 1958, nor Elmore, 1958, nor Gates, 1947, nor Rydb., 1894]. Stylodon carolinense Raf. ex Moldenke, Résumé 350, in syn. 1959. Stylodon carolinensis Walt. ex Moldenke, Résumé 350, in syn. 1959. Verbena caroliniana (Walt.) Michx. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960.

Cinereous, scabrid-hirtellous, perennial herb 15--80 cm. tall, with a creeping rhizome and fibrous roots; stems simple or sparingly branched above, ascending, tetragonal, puberulent or hirtellous; leaves spatulate or oblong-spatulate to oblong, or the upper ones oblong-hastate, sessile, cuneate-attenuate at the base, obtuse at the apex, 2.5--5 cm. long, shallowly and doubly serrate-dentate, entire toward the narrowed base, scabrous and rugose above, less harsh and spreading-pubescent along the prominently reticulate veins beneath; spikes terminal, pedunculate, slender or filiform, elongate, chiefly solitary but occasionally in 3's; flowers rather remote on the rachis, more crowded near and at the tips of the spikes, more widely separated in fruit; bractlets lanceolate or lanceolate-subulate, one-third to one-half as long as the calyx, glandular-pubescent; calyx 4--5 mm. long, glandular-pubescent, its lobes or teeth unequal, acute at the apex; corolla varying from flesh-color, pink, pale-pink, or pinkish-white to rose, lavender, or blue, occasionally white, white with pink exterior, or white with a purple-tinged tube, usually about half again as long as the calyx, its tube slightly longer than the calyx, pubescent on the outer surface, its limb about 5 mm. wide, the segments subtruncate; anthers glandless; fruit nut-like, about 3 mm. long, not readily separating into 4 cocci, longitudinally sulcate and commonly scrobiculate on the upper part, with 4 broad plane surfaces at the tip which form a cap-like beak.

No actual type of Medicus' Verbena carnea is known. The late Dr. J. H. Barnhart, in a memorandum to me in the autumn of 1941, says "I have never heard of any Medicus specimens. He was in charge of the palace garden at Mannheim, and very likely described from living plants. Whether he or the garden had a herbarium, I do not know, but if so it may have been destroyed in the Austrian bombardment of 1796, which nearly wiped out the town. The old-time palace garden was at last accounts a public park; perhaps, after 160 years, the verbenas still grow there! As far as I know, the present-day herbarium nearest (10 miles) to Mannheim is at the University of Heidelberg, and is very little known to taxonomic botanists. If it were not for this war inquiries might locate Medicus specimens there, but that is not likely."

Medicus' original description is "Die Oeffnung des Blumenrohres ist, wie bei den vorher gehenden [V. mexicana, V. nodiflora, V. officinalis, V. obletia, V. caroliniana] mit einem dichten Kreise feiner Haare geschlossen, und unter dieser Ueber-

wölbung stehen die vier Staubfäden, von denen die mittlern etwas höher, als die beiden andern sind, und haben kaum sichtbare Fäden. Der Griffel scheint auch aus zwei Haarröhrchen zu bestehen, und hat oben zwei Narben; die eine halbkugelförmig, die andere neben daran stehende stachelförmig und abstehend. Oft habe ich auch zwei kugelförmige Narben angetroffen. Ueberhaupt sind hier die Narben in Betracht ihrer Größe sehr beträchtlich. Die Blume ist fleischfarben. Viel kommt diese Art mit der vorher gehenden überein, ausser in den Narben, und die Farbe der Blume. Auch ist ein Unterschied an den Blättern." It is of interest to note that the species to which he compares his plant are actually Priva mexicana (L.) Pers., Phyla nodiflora (L.) Greene, Verbena officinalis L., V. canadensis (L.) Britton, and V. carolina L.

Schauer, in the reference cited above, cites Beyrich, Bosc, and Fraser specimens from "Carolina" and a Mitchell specimen from Florida. The only common names recorded for the plant are "Carolina verbena", "Carolina vervain", and "Carolinavervain". It has been collected in sandy barrens, pine barrens and dry pine barrens, in woods, dry sandy woods, dry sandy open woods, and dry oak woods, in upland pinelands, high pinelands, dry pinelands, open pinewoods, and moist pinewoods, in old fields and waste ground, and on dry banks. Collectors report it from live oak hammocks, dry woods, open fields, dry sandy open places, and moist sandy soil along lakesides, also in sand hills, on dunes along beaches, in sandy ground, and in dry soil and fields generally; also on a university campus. It is typically a plant of the Coastal Plain from North Carolina to Florida and west to Louisiana and Texas. It has been found at 40 feet altitude. It has been recorded from Virginia by Britton & Brown, but I have not as yet seen a specimen from that state. Earle, in the reference cited above, says it is "frequent in dry sandy woods" in Alabama. It has been collected in flower and in fruit from April to August.

Specimens of this plant have been confused with and misidentified in herbaria as V. canadensis (L.) Britton, V. polystachya H.B.K., V. stricta Vent., V. scabra Vahl, V. carolina L., and Buchnera americana L. Ravenel thought that his specimen was "probably" a hybrid between V. hastata L. and V. stricta Vent. It is worth noting here that V. hastata x stricta of Allen is actually V. stricta f. albiflora Wadmond, of Elmore is V. hastata L., and of Anderson, of Gates, and of Rydberg are xV. rydbergii Moldenke.

The "Index Kewensis" (2: 504. 1894) reduces Phryma carolinensis Walt. to P. leptostachya L. of the Phrymaceae, and reduces Stylodon scabrum Raf. and Styleurodon carolinianum Raf. to Verbena carolina L.

Godfrey & Tryon 180 in the Duke University herbarium contains a package of fine seeds which show the generic characters of this plant exceptionally well. The O'Neill s.n. [Brooksville, July 2, 1929], determined as this species, is actually

Eupatorium verbenaeifolium Michx. The Collector undesigned s.n. in the University of Vermont herbarium is a mixture with Verbena tampensis Nash, while the T. Drummond s.n. at Stockholm is a mixture with V. xutha Lehm.

O'Neill found Stylodon carneus growing on an average of 260 plants per acre at Madison, Florida. Seymour records the following fungi as attacking this plant: Cercospora septatissima Tracy & Earle, C. truncatella Atk., and C. verbenicola Ell. & Ev. Martius, on his no. 1470, makes this interesting comment: "an proles hybrida folia Verbenae strictae flores V. urticifolia."

In all, 188 herbarium specimens have been examined.

Citations: NORTH CAROLINA: Bladen Co.: R. K. Godfrey 49207 (No--15897). Brunswick Co.: Oosting 3572 (H--28952, N). Craven Co.: Randolph & Randolph 535 (Ba). Harnett Co.: W. B. Fox 3636 (No--23361); R. K. Godfrey 4239 (H--47043); B. W. Wells s.n. [6/15/1927] (No--8598), s.n. [5/23/1929] (No--8596). Moore Co.: Blomquist & Anderson 10277 (H--50264); B. Knipe s.n. [June & July 1901] (Cm). New Hanover Co.: Macfarlane's Party s.n. [June 16--22, 1894] (Up--36363). Pender Co.: M. E. Hyams s.n. [Burgaw, July 1879] (Bc), s.n. [Burgaw, May 1880] (Ka). Sampson Co.: Fox & Boyce 3795 (N). Wake Co.: Collector undesigned s.n. [Raleigh] (N). Wayne Co.: B. W. Wells s.n. [July 2, 1946] (No--8594). County undetermined: Ashe s.n. [southeastern North Carolina] (Po--63898). SOUTH CAROLINA: Aiken Co.: Ravenel s.n. [Aiken, May '67] (Ms), s.n. [Aiken, July 1870] (N). Charleston Co.: Gibbes s.n. [Charleston, 1838] (N). Georgetown Co.: Godfrey & Tryon 180 (Gg--290706, H--58065, It, N). Orangeburg Co.: House 3276 (N). County undetermined: Gibbes s.n. (N); F. V. Hayden s.n. (Up--17101). GEORGIA: Baker Co.: R. F. Thorne 4026 (N, Vi). Burke Co.: Ellis s.n. [Alexander] (Po--64685). Chatham Co.: Oemler s.n. [1837] (Lu). Crawford Co.: D. E. Eyles 2575 (Sa). Dodge Co.: W. H. Duncan 5028 (Gu). Dougherty Co.: J. K. Small s.n. [May 24--28, 1895] (C). Emanuel Co.: Craig & Craig 3395 (Po--248456). Laurens Co.: W. H. Duncan 4991 (N). Lowndes Co.: Quarterman 508 (H--69536). Richmond Co.: Cuthbert 268 (N), s.n. [Augusta, June 12, 1898] (Fl--21095, Fl--21096), s.n. [Augusta, July 31, 1898] (Fl--21095), s.n. [Augusta, July 1, 1899] (Fl--21098), s.n. [Augusta, May 14] (Fl--21097). Tift Co.: Woodroof & Jenkins s.n. [near Tifton, May 17, 1939] (Ga, Ga). Toombs Co.: McKay s.n. [29 Aug. 1929] (Gu). County undetermined: Feay s.n. [Ga.] (Pa); Mattams s.n. [Ga.] (Pa). FLORIDA: Alachua Co.: Arnold & West s.n. [17 April 1935] (Fl--21054); J. H. Barnhart 2039 [Herb. Barnhart 2486] (N); O'Neill 483 (I), 986 (I); Van Hyning s.n. [April 17, 1924] (Ob--50784); G. F. Weber s.n. [4-1-28] (Fl--21100), s.n. [4-15-28] (Fl--21102). Bradford Co.: H. C. Beardslee s.n. [April 26, '37] (Ob--97285). Calhoun Co.: H. C. Beardslee s.n. [Apr. 21,

1939] (Ob--97286). Clay Co.: Canby s.n. [Hibernia, July 12] (C, Pr). Columbia Co.: Watson & Murrill s.n. [4/30/39] (Fl--30163). Duval Co.: Curtiss 1959 (Bc, Cm, I, Mm--15399, Or--8856, Up--17100, Vi, Vt), 4386 (Du--90893, Es), 4765 (Al, C, Es, Io--38753, Mm--15398), 6159 (Fl--21093, Ur, Vt), s.n. [Apr. 29, 1893] (Ob--50787); Fredholm 110 (Po--70982); Lighthipe 116 (N, Ob--50785), s.n. [So. Jacksonville, Apr. 29, 1896] (Mi). Escambia Co.: G. L. Fisher s.n. [Pensacola, May 11, 1928] (Ew, Fs, Gg--230878); Macfarlane s.n. [Pensacola, June 1905] (Up--40306); Tisdale s.n. [5-2-33] (Fl--21103). Franklin Co.: Biltmore Herb. 4761a (N). Hernando Co.: Chrysler & Johnson 295 (Ru); McFarlin 4954 (Gg--237862, I); H. N. Moldenke 5946 (N). Jackson Co.: Mulvania 75 (Hp). Jefferson Co.: Lighthipe s.n. [April 4, 1891] (Ob--50786). Lake Co.: A. S. Hitchcock s.n. [vicinity of Eustis, June & July 1894] (Ka), s.n. [Eustis, 1894] (Fl--21094); Nash 601 (Es, Es, Mi, Mm--15400). Leon Co.: Berg s.n. [near Tallahassee] (N). Liberty Co.: Arnold s.n. [22 July '40] (Fl--32352). Madison Co.: O'Neill s.n. [Madison, August 1, 1929] (I). Marion Co.: H. N. Moldenke 1091 (Go, H--5463, N, S, Up, Ur). Orange Co.: F. K. Lewton s.n. [Lake Brantley, July 7, 1894] (N); F. L. Lewton s.n. [June 26, 1894] (No--22740). Palm Beach Co.: H. C. Beardslee s.n. [Lake Worth, March 1928] (Ob--97283). Polk Co.: Buswell s.n. [March 30, 1919] (Bu). Putnam Co.: Laessle s.n. [5/18/40] (Fl--32353). Saint Johns Co.: M. C. Reynolds s.n. [St. Augustine, 1877] (N). Seminole Co.: H. C. Beardslee s.n. [Longwood, November 1927] (Ob--97291). Volusia Co.: E. Brainerd s.n. [March 30, 1909] (Vt); Chrysler & Johnson 335 (Ru); La Force s.n. [April 6, 1921] (Al). Wakulla Co.: Rugel s.n. [inter Tallahassee et St. Marks] (M). Walton Co.: West & Arnold s.n. [4/28/38] (Fl--29767). Washington Co.: Small, Mosler, & Matthaues 12831 (N). County undetermined: Buckley s.n. (Io--15345); Boher s.n. [McMuhin, Aug. 7, 1932] (Ob--97284); Chapman s.n. (C); Collector undesignated s.n. (T, Vt); Curtiss s.n. [Florida, 1888] (Mm--15376); Hasse s.n. (N); J. Torrey s.n. [Florida, 1835] (S). ALABAMA: Baldwin Co.: Faust s.n. [P. O. Schallert 446] (H--5462); Tracy 8050 (N, Tr). Lee Co.: Earle s.n. [Auburn, 5/10/1896] (C); Earle & Baker 1181 (C), s.n. [Auburn, 8-11-1897] (Ka), s.n. [Auburn, 10-2-1897] (N); Earle & Underwood s.n. [Auburn, 10 May 1896] (C). Mobile Co.: Bush 312 (N); Demaree 35250 (Ss); J. A. Drushel 2334 (Ur); Jewett s.n. [Mobile] (Mi, Mi); Mackenzie 4036 (N); C. T. Mohr s.n. [Mobile, June] (Mi), s.n. [June 1886] (Du--90898). County undetermined: Buckley s.n. [Pinewood] (T). MISSISSIPPI: George Co.: Ahles & Bell 7698 (Ur); Demaree 34933 (Z). Harrison Co.: Demaree 35118 (Ss); Gerhart 42 (N); Macfarlane & Goertz s.n. [Back Bay, June 10, 1905] (Up--39371); Tracy 4981 (Mi, N). Jackson Co.:

Earle s.n. [Ocean Springs] (N); Seymour & Earle 118 [Herb. Wall 5] (S); Skehan 118 (Ur), 1600 (Mi), 22587 (Ur). County undetermined: Gerhart 50 (N). LOUISIANA: Orleans Par.: Cocks s.n. [N. O., July 1899] (Tl), s.n. [N. O., July 1901] (Tl); T. Drummond s.n. [New Orleans, 1832] (S). Rapides Par.: Hale s.n. [Alexandria] (Pa). Saint Tammany Par.: Joor s.n. [Aug. 14, '88] (Tl); Langlois s.n. [14 July 1884] (I), s.n. [16.IV.1894] (I). TEXAS: Hardin Co.: M. B. Morrow s.n. [Kountze, 4.20.30] (Au); E. J. Palmer 9559 (Du-204186, S); Parks & Cory 23363 (Tr); Warner s.n. [Saratoga, April 21st] (Hu). Jasper Co.: Lundell & Lundell 10552 (Id, N). Jefferson Co.: Hooks s.n. [Beaumont, 5-30-34] (Au). Kleberg Co.: Tracy s.n. [Kingsville, 4-10-1905] (Tr). Newton Co.: Tharp 2775 (Au), 2776 (Au), 2779 (Au). CULTIVATED: Germany: Herb. Calif. Acad. Sci. 31461 (Gg). LOCALITY OF COLLECTION UNDESIGNATED: Curtiss s.n. [Southern States, 1875; Herb. Saldanha 2762] (Ja, Ka); Herb. Martius 1470 (Br); Herb. Univ. Vermont 9592-20 (Vt); Walter s.n. (Pr); A. Wood s.n. (Pa).

MATERIALS TOWARD A MONOGRAPH OF THE GENUS HIEROBOTANA

Harold N. Moldenke

This is the twenty-fourth in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated were Aegiphila Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Stylodon Raf., Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material was examined, in whole or in part, the the preparation of these works will be found in *Phytologia* 5: 154-159 (1955), 6: 242 (1958), and 7: 91-92 (1959) and 123-124 & 293 (1960).

HIEROBOTANA Briq. in Engl. & Prantl, *Mat. Pflanzenfam.* 4 (3a): 148. 1895.

Synonymy: Hierobotana (Kunth) Briq. ex Cavillier, *Candollea* 6: xxxvi. 1936. Hierobotama Briq. ex Moldenke, *Prelim. Alph. List Invalid Names* 27, in syn. 1940. Hierobotoma Briq. ex Moldenke, *Prelim. Alph. List Invalid Names* 27, in syn. 1940.

Hierotama Briq. ex Moldenke, Prelim. Alph. List Invalid Names 27, in syn. 1940. Hierobotana Engl. & Prantl ex Moldenke, Alph. List Invalid Names Suppl. 1: 10, in syn. 1947. Hierotoma Briq. ex Moldenke, Résumé Suppl. 2: 9, in syn. 1960.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 273, pl. 135. 1818; Spreng., Syst. Veg. 2: 749. 1825; Steud., Nom. Bot., ed. 2, 750. 1840; Walp., Repert. 4: 25. 1845; Benth., Pl. Hartweg. 245. 1846; Schau. in A. DC., Prodr. 11: 550. 1847; Benth. in Benth. & Hook. f., Gen. Pl. 2 (2): 1146. 1876; Jacks., Ind. Kew. 2: 1179. 1895; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1895; Dalla Torre & Harms, Ind. Siphonog. 633 & 770. 1900; Durand & Jacks., Ind. Kew. Suppl. 1: 213. 1902; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patagonia 8 (2): 686. 1905; Stapf, Ind. Lond. 6: 430. 1931; Junell, Symb. Bot. Upsal. 4: 15. 1934; Cavillier, Candollea 6: xxxvi. 1936; Moldenke, Geogr. Distrib. Avicenn. 22 & 23. 1939; Moldenke, Prelim. Alph. List Invalid Names 27, 45, & 46. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 35, & 93. 1942; Moldenke, Alph. List Invalid Names 26, 46, & 48. 1942; Moldenke, Alph. List Cit. 1: 10, 50, 113, 118, 202, 262, & 325. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 10. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 30. 1948; Moldenke, Alph. List Cit. 2: 347, 409, 424, 427, 428, 491, 544, 573, 580, & 641-643 (1948), 3: 857, 871, 872, 901, 950, & 956 (1949), and 4: 979 & 1113. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69, 72, & 186. 1949; Moldenke, Mem. N. Y. Bot. Gard. 9: 176. 1955; Moldenke, Résumé 79, 83, 298, 361, 367, & 456. 1959; Moldenke, Résumé Suppl. 2: 9 & 11. 1960.

Subshrubs, strigose-hispidulous and canescent throughout; stems and branches obtusely tetragonal, procumbent or ascending; leaves decussate-opposite, exstipulate, sessile or subsessile, 3-parted, herbaceous, the divisions much-laciniate; inflorescence centripetal (racemose), terminal, spicate, eventually elongate, simple; flowers hypogynous; calyx gamosepalous, cylindric, very slightly zygomorphic or practically actinomorphic, weakly 5-ribbed, the rim equally 5-toothed; corolla gamopetalous, slightly zygomorphic, the tube included by the calyx, more or less pilose in the throat, the limb small, spreading, 5-lobed, the lobes subequal, rounded, somewhat emarginate at the apex, arranged in bud like those of Verbena, that is, the 2 posterior ones outermost and the anterior one innermost; fertile stamens 2, anterior, inserted in the corolla-tube, included; anthers ovate, unappendaged, with parallel thecae and elongate connective; staminodes 2, posterior, minute, or absent; pistil one; style single, short, 2-lobed at the apex; ovary 2-carpellary, plainly 4-lobed, completely 4-celled, 4-ovulate; fruiting-calyx conspicuously inflated at the base, the teeth bent together in brush-like fashion; fruit enclosed by the mature calyx, dry, schizocarpous, separating at maturity into four 1-seeded linear-oblong cocci.

This genus, as far as is now known, is monotypic, the type species being Verbena inflata H.B.K. [= Hierobotana inflata (H.B.K.) Briq.]. It is native to western South America from Ecuador

into Peru. Previous "records" from Colombia are apparently erroneous — the collections so designated were made in what is now Ecuador. The generic name is an adaptation by Briquet of "hierobotane", a pre-Linnean name applied by Brunfels and others to what is now known as Verbena officinalis L.

Junell, in the reference cited above, says "Die Gattung, welche nur diese Art von Columbien umfasst, weicht dadurch von Verbena ab, dass der Kelch bei der Fruchtreife anschwillt, und dass nur die vorderen Staubblätter fertil sind. Die Konnective der Staubblätter sind sehr lang ausgezogen, so dass man an Querschnitten von Blüten der Eindruck erhält, also ob wirklich vier Staubblätter vorhanden wären. Hinsichtlich des Fruchtknotenbaus stimmt diese Gattung mit Verbena, und zwar zufolge des Umstands, dass der Fruchtknoten deutlich vierlappig ist, am besten mit V. canadensis überein."

Dalla Torre & Harms, on page 633 of the reference given above, point out that Briquet's original publication should be dated "1895", not "1894" as it sometimes is. They list the genus as their no. 7140.8. Schauer describes the fruit rather inaccurately as a capsule.

HIEROBOTANA INFLATA (H.B.K.) Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148 [as (Kunth) Briq.]. 1895.

Synonymy: Verbena inflata H.B.K., Nov. Gen. & Sp. Pl. 2: 273. pl. 135. 1818. Verbena heterophylla Willd. ex Spreng., Syst. Veg. 2: 749, in syn. 1825. Verbena inflata Kunth apud Schau. in A. DC., Prodr. 11: 550. 1847. Hierobotama inflata (Kunth) Briq. ex Moldenke, Prelim. Alph. List Invalid Names 27, in syn. 1940. Hierobotoma inflata (Kunth) Briq. ex Moldenke, Prelim. Alph. List Invalid Names 27, in syn. 1940. Verbena ceratophylla Bonpl. ex Moldenke, Prelim. Alph. List Invalid Names 45, in syn. 1940. Verbena inflata Humb. & Kunth ex Moldenke, Résumé 367, in syn. 1959. Hierotoma inflata (Kunth) Briq. ex Moldenke, Résumé Suppl. 2: 9, in syn. 1960. Verbena heteraphylla Willd. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960.

Literature: see under genus as a whole.

Illustrations: H.B.K., Nov. Gen. & Sp. Pl. 2: pl. 135. 1818.

Perennial herb or subshrub, 20--60 cm. tall, often prostrate in large clumps, forming mats, or decumbent with ascending branches, canescent and strigose-hispidulous throughout; stems very woody and heavy at the base, ramose; branches slender, prostrate and creeping, often arranged in stellate-radiate fashion, obtusely tetragonal; internodes mostly abbreviated; leaves herbaceous, sessile or subsessile, decussate-opposite, exstipulate, light-green with a bluish cast when fresh, 3-parted almost to the base, about 2.5 cm. long, the segments narrow, the lateral ones 2- or 3-fid, the intermediate ones 3--5-fid, the ultimate divisions very narrow or linear, rather obtuse at the apex, revolute along the margins, canescent and strigose-hispidulous throughout; petioles, if present, very short and gray-hairy; inflorescence terminal, spicate, simple, sessile and oblong when

young and densely many-flowered, finally becoming more loosely flowered and fruited and subpedunculate at the base; bractlets lanceolate-subulate, shorter than the calyx; flowers pleasantly scented, with the fragrance of Heliotropium arborescens L.; calyx gamosepalous, tubular, very slightly zygomorphic or almost actinomorphic, greenish to red or reddish-brown, about 4 mm. long, equaling the corolla-tube, weakly 5-ribbed, the rim equally 5-toothed, the herbaceous ribs prolonged into 5 subequal subulate mucros from the tips of the teeth; corolla gamopetalous, slightly zygomorphic, varying from white or whitish to blue-violet, lilac, or purple, the limb small, spreading, the lobes often white with a faint flush of violet along the margins, subequal, rounded, more or less emarginate at the apex, the 2 posterior ones outermost and the anterior one innermost in prefloration, the throat more or less pilose or villous; fertile stamens 2, inserted in the throat of the corolla-tube, included, anterior; anthers ovate, with parallel thecae, unappendaged, the connective elongate; staminodes 2, minute and posterior, or absent; ovary plainly 4-lobed, superior, 4-celled, each cell 1-ovulate; fruiting-calyx conspicuously inflated at the base, enclosing and slightly surpassing the fruit, the subulate teeth of the rim bent together in brush-like fashion; fruit dry, schizocarpous, obovate, thick, included by the mature calyx; cocci 4, linear-oblong, reticulate-wrinkled on the testa, separating at maturity.

This is the type species of the genus. The type specimen was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland [Herb. Willdenow 11116] between Muçalo, Riobamba, and Tambillo, at an altitude of 3000 meters, Ecuador, and is deposited in the Willdenow Herbarium at the Botanisches Museum in Berlin. The Bonpland specimen in the Paris herbarium has its number not plain, but is probably part of the type collection. Its label is inscribed "Verbena heterophylla" by Willdenow and "Verbena inflata mihi" by Kunth.

The species has been collected in sandy soil and in volcanic ash soil, on grassy and very dry ground, in thickets and dry meadows, on plateaus and the dry sunny plains of interandine highlands, in Stipa puna, and on dry Cangahua formations, at altitudes of 1500 to 3500 meters. Collectors have found it among scattered Croton species and herbs on open sand flats and also in Opuntia and Agave rows separating cultivated patches of land. It is said to be common in open xerophytic formations comprising plants with a short growth period, mostly cacti, shrubs and subshrubs that are green only in the rainy season, and annual herbs. It has been found in anthesis from April to February, and in fruit in January, February, April to June, August, September, and November, so it is probable that it flowers and fruits throughout the year.

Briquet states that it resembles in habit Verbena canescens H.B.K. and V. bipinnatifida Nutt., but can easily be distinguished from these North American species by its inflated fruiting-calyx and only 2 fertile stamens. Junell says that it appears to

be related to V. canadensis (L.) Britton, also of North America. Actually, the resemblance to any of these species is not very marked. It appears to me to resemble much more closely Verbena hookeriana (Covas & Schnack) Moldenke and V. crithmifolia Gill. & Hook., of Argentina, Chile, and Ecuador.

Rose & Rose 22400 was misidentified by B. L. Robinson as V. microphylla H.B.K. The Berlin sheet of Hartweg 1352 is labeled "Columbien", and the Geneva sheet is inscribed "Quito-Popayan-Bogota", but the New York and Brussels duplicates plainly indicate that the collection was made at Riobamba, near Quito, Ecuador. The Sodiro 126/18 at Berlin has an annotation saying "soll wohl 125/18 heissen." Inexplicably, Bentham (1876) calls this a Mexican species -- "V. inflata, H. B. et K., species Mexicana..."

In all, 76 herbarium specimens, including the types of all the names involved, and 4 mounted photographs have been examined.

Citations: ECUADOR: Chimborazo: André K.1549 (K, N); Asplund 5932 (S), 20464 (S); Fagerlind & Wibom 798 (S), s.n. (S); Rauh & Hirsch E.49 (Z); Rimbach 163 (B), 465 (Mi, S); Rose & Rose 22400 (G, N); Schimpff 727 (Cb, E--1080111), 746 (A, Cb, Cb, E--1087389). Cotopaxi: Weydahl 161 (S). Imbabura: André K.1547 (K, N); Asplund 20228 (S); R. Espinosa 2427 (N); Firmin 366 (N); F. C. Lehmann 6239 (B, K), K.290 (K); Sttbel 130 (B), 139 (B). Pichincha: Asplund 16145 (S), 17069 (S); Bonpland 503 (P--isotype); Collector undesignated 193 (K), 228 (K); Fosberg 22537 (N, N); Hartweg 1352 (B, B, Br, Cb, K, N, P); Heilborn 512 (S); Humboldt & Bonpland s.n. [Regno Quitensi; Herb. Willdenow 11116] (B--type, F--976442--isotype, N--photo of type, Z--photo of type); Jameson s.n. [vicinity of Quito, 1831--2] (La); Moldenke & Moldenke 19786 (Mg, N, No, Ot); Spruce 5891 (Ed, G, K, K, L, N). Tunguragua: Bücher, Hjerting, & Rahn 78 (S); Camp E.2427 (N); Fosberg & Giler 22551 (N); A. S. Hitchcock 21737 (G, N, N). Province undetermined: André K.1548 [Vicente] (N); J. N. Rose 23906 [Luisa] (N); A. Sodiro 126/18 (B, B). PERU: Arequipa: Weberbauer 5749, in part (B, B, G, N, N--photo, Z--photo). Ayacucho: Weberbauer 5749, in part (E--1008707, F--628950). Department undetermined: Collector undesignated s.n. (Cb). LOCALITY OF COLLECTION UNDESIGNATED: Herb. Link s.n. [Am. mer.] (B); Herb. Sprengel s.n. (B).

MATERIALS TOWARD A MONOGRAPH OF THE GENUS DIOSTEA

Harold N. Moldenke

This is the twenty-fifth in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated were Aegiphila

Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Hierobotana Briq., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Stylodon Raf., Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material was examined, in whole or in part, in the preparation of these works will be found in *Phytologia* 5: 154--159 (1955), 6: 242 (1958), and 7: 91--92 (1959), 123--124 (1960), and 293 (1960).

DIOSTEA Miers, Trans. Linn. Soc. Lond. Bot. 27: 102, pl. 28. 1870.

Synonymy: Baillonia Benth. ex Rehd., Bibl. Cult. Trees 583, in syn. [as "sensu Benth."]. 1949; Moldenke, Résumé 236, in syn. 1959 [not Baillonia Bocq., 1862].

Literature: Hook., Bot. Misc. 1: 161--162, pl. 47. 1829; Walp., Repert. Bot. Syst. 4: 72. 1845; Schau. in A. DC., Prodr. 11: 544, 545, 556, 573, & 614. 1847; C. Gay, Hist. Fis. Chile Bot. 5: 20--22 & 30. 1849; R. A. Phil., Linnaea 29: 21--22 & 31. 1857; R. A. Phil., Anal. Univ. Chile 2: 402. 1862; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 195. 1863; R. A. Phil., Linnaea 33: 196. 1864; R. A. Phil., Anal. Univ. Chile 35: 192--193. 1870; Miers, Trans. Linn. Soc. Lond. Bot. 27: 102--108, pl. 28. 1870; Benth. in Benth. & Hook. f., Gen. Pl. 2: 1133, 1143--1144, & 1146. 1876; Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 276. 1879; F. Phil., Cat. Pl. Vasc. Chil. 217. 1881; Jacks., Ind. Kew. 1: 264, 768, & 777 (1893), 2: 95 & 96 (1894), and 2: 1178 & 1179. 1895; S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 438. 1895; R. A. Phil., Anal. Univ. Chile 90: 623. 1896; Briq., Bull. Herb. Boiss. 4: 342--343. 1896; Hook. f. in Curtis, Bot. Mag. 126: pl. 7695. 1900; Briq., Ann. Conserv. & Jard. Bot. Genève. 4: 22. 1900; Speg., Anal. Soc. Cient. Argent. 53: 242. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 23 & 61. 1904; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patagonia 8 (2): 691. 1905; Reiche, Fl. Chile 5: 282--283 & 298. 1910; Bean, Trees & Shrubs 1: 495. 1914; Hosseus, Trab. Inst. Bot. & Farm. Fac. Cienc. Med. Buenos Aires 33: 67. 1915; Skottsberg, Kungl. Svensk. Vetens. Handl. 56 (5): 292. 1916; Rothkugel, Bosques Pat. 194. 1916; Sanzin, Anal. Soc. Cient. Argent. 88: 103--104 & 122--123. 1919; J. W. C. Kirk, Brit. Fl. Gard. 433. 1927; Baeza, Nomb. Vulg. Pl. Silv. Chile, ed. 2. 1930; Stapf, Ind. Lond. 2: 501 (1930), 4: 125 (1930), and 6: 431. 1931; Moldenke in Fedde, Repert. Sp. Nov. 37: 217. 1934; Junell, Symb. Bot. Upsal. 4: 11--13, 15, 31, 32, 37, 78, & 210, fig. 7, 54, & 55. 1934; Latzina, Trab. Inst. Bot. & Farm. Fac. Cienc. Med. Buenos Aires 54: 79. 1935; Moldenke in Fedde, Repert. Sp. Nov. 41: 62 & 134. 1936; H. S. Marshall, Kew Bull. 1936: 87. 1936; Moldenke, Revist. Sudam. Bot. 5: 1. 1937; Latzina, Lilloa 1:

189. 1937; Moldenke, Geogr. Distrib. Avicenn. 1, 28, 29, & 39. 1939; Moldenke, Alph. List Common Names 8 & 26. 1939; Moldenke in Fedde. Repert. Spec. Nov. 46: 201. 1939; Moldenke, Lilloa 5: 386-389. 1940; Moldenke, Prelim. Alph. List Invalid Names 6, 15, 16, 24, 31, 38, 45, 46, 48, 55, & 56. 1940; Moldenke, Suppl. List Invalid Names 4--7 & 12. 1941; Moldenke, Darwiniana 5: 168--171, 175, & 177. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42, 43, 73, & 92. 1942; Moldenke, Alph. List Invalid Names 6, 13, 14, 23, 27, 31, 32, 39, 46, 48, & 50. 1942; Moldenke, Lilloa 10: 369. 1944; Moldenke, Phytologia 2: 102. 1944; Darlington & Janaki Ammal, Chromosome Atl. 271. 1945; Moldenke, Alph. List Cit. 1: 16, 28, 34, 38, 59, 76, 77, 80, 88, 96, 101, 105, 120, 123, 131, 135, 136, 166, 190, 230, 233--235, 247, 251, 262, 265, 276, 316, & 326. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 76. 1947; Moldenke, Alph. List Cit. 2: 348, 350, 367--369, 372, 389, 411, 415, 416, 425, 437, 441, 443, 446, 498, 504, 535, 537, 554, 555, 565, 576, 599, 600, & 640. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 31 & 43. 1948; Rehd., Bibl. Cult. Trees 583. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100, 103, 160, & 185. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 6. 1949; Moldenke, Alph. List Cit. 3: 667, 671, 686, 700, 722, 731, 735, 748, 750, 767, 772, 781, 798, 802, 812, 813, 823, 843, 848, 894, 910, 917, & 951 (1949) and 4: 980, 1030, 1049, 1050, 1056, 1062, 1064, 1067, 1068, 1070, 1071, 1090, 1098, 1104, 1115, 1116, 1128, 1187, 1191, 1199, & 1209. 1949; Moldenke, Journ. Calif. Hort. Soc. 15: 84. 1954; Boelcke, Revist. Invest. Agric. 11: 87 & 88. 1957; Moldenke, Phytologia 6: 254 & 255. 1958; Moldenke, Résumé 120, 123, 218, 236, 253, 255, 256, 278, 301, 310, 313, 317, 340, 362, 367, 374, 379, 406, & 454. 1959; Moldenke, Résumé Suppl. 1: 23 & 25 (1959) and 2: 5, 8, & 9. 1960.

Low shrubs of the Andean region of Argentina and Chile; stems mostly branched from the base; branches abundant, virgate, opposite or in whorls of 4's, twiggy, mostly erect or ascending; branchlets and twigs often erect or ascending, terete, often fistulose or subfistulose and nigrescent in drying, often more or less aphyllous, with the aspect of Ephedra; nodes mostly distant; leaves decussate-opposite, small, deciduous, caducous, linear or oblong to ovate, mostly entire and sessile, sometimes dentate and short-petiolate; inflorescence terminal, rather loosely or densely spicate, often nigrescent in drying; flowers sessile or very short-pedicellate, hypogynous, complete, perfect, subtended by small bractlets; calyx gamosepalous, persistent, cylindric, slightly zygomorphic, its rim unequally 5-dentate, the teeth subulate; corolla gamopetalous, hypocrateriform, zygomorphic, cylindric at the base, the tube usually about 2--3 times as long as the calyx, slightly incurved, long-hirsute with white retrorse hairs toward the front within, the limb somewhat oblique, 5-lobed, the lobes small, ovate or oblong, spreading, entire or often subemarginate at the apex; fertile stamens 4, inserted at about the middle of the corolla-tube, included, in two superposed pairs; filaments rather short, filiform, glabrous, the 2 upper ones anterior and slightly long-

er, the 2 lower ones posterior and slightly shorter, a fifth stamen often represented by a sterile staminode situated between the posterior stamens and much shorter; pistil one, compound, 1-carpellary; style included, filiform, compressed, gradually dilated toward the subobliquely truncate apex, the upper or lower side uncinately recurved; stigma globose or subglobose, papillose; ovary oblong, on a cushion-like disk, in its early development from a single carpel like that of Casselia Nees & Mart., at first imperfectly 1-celled, two short parallel semisepta advancing from the sulcated anterior side across the center, where they are each reflected, while, as growth continues, two other semisepta advance from the posterior wall and, uniting with the first two, make the ovary 2- or 4-celled when mature, the cells lateral and usually 1-ovulate, rarely 2-ovulate, the ovules erect, the dissepiment plainly 2-lamellate for its entire length; fruit drupaceous or schizocarpous, ovate, enclosed by the swollen persistent calyx, composed of two pyrenes, the pericarp rather dry, smooth, shiny; pyrenes lateral in respect to the axis, plano-convex, dry, horny, dark, smooth, 1-celled, usually 1-seeded, rarely 2-seeded, convex outside, flat inside, with the margins rounded within, having at the base on the anterior side a long oval white placentiferous patch, covering a small foramen which leads into the base of the cell, continuous with a laterally ascending raphe the whole length of the seed and terminating in a small apical chalaza; seeds anatropous; embryo without endosperm; cotyledons 2, thickly fleshy, paralleling the inner face of the pyrenes, about 3 times as long as the conic inferior radicle.

The type species of this small genus, comprising only three known species from Chile and Argentina, is Verbena juncea Gill. & Hook. [= Diostea juncea (Gill. & Hook.) Miers]. Miers notes that the characters of the fruit and seed are essentially those of Dipyrena Hook., with the important difference that in Diostea the pyrenes ["mucules"] are 1-locular. He says "Schauer in his monograph of the family, places D. juncea in Lippia and D. scoparia in Verbena, stating erroneously that its fruit is a 4-coccous capsule." The two species are obviously closely related and Schauer's Verbena cinerascens certainly belongs with them.

A key for the identification of the species of Diostea:

1. Young parts densely white-pubescent.....D. cinerascens.
- 1a. Young parts glabrous or essentially so.
 2. Branches and branchlets usually not nigrescent; leaves not very noticeably caducous, the blades 0.6--3 cm. long and 2--9 mm. wide.....D. juncea.
 - 2a. Branches and branchlets nigrescent; leaves always caducous, the blades 3--4 mm. long and about 2 mm. wide...D. scoparia.

Miers makes the following interesting comments: "From Verbena it is manifestly distinct and it differs from Lippia in its peculiar habit, its inflorescence, and in its corolla with a 5-lobed

(not 4-lobed) border, and other particulars. Walpers, in his arrangement of the genus Verbena, places the species of this group in a separate division, Juncea, in which he includes V. ephedroides, V. alata, and V. sagittata of Chamisso; but these belong to Verbena, having a fruit of four mucules; he also includes V. glauca and V. aphylla, Hook. & Gill., which do not possess the features of Diostea, their fruit being that of Verbena." Actually, V. aphylla is Neosparton aphyllum (Gill. & Hook.) Kuntze and V. glauca is Junellia glauca (Gill. & Hook.) Moldenke.

The generic name, Diostea, is derived from the Greek, $\delta\iota$ (two) and $\sigma\tau\epsilon\alpha$ (nutlets).

DIOSTEA CINERASCENS (Schau.) Moldenke, Revist. Sudam. Bot. 5: 1. 1937.

Synonymy: Citharexylon alpinum Poepp. ex Walp., Repert. Bot. Syst. 4: 78, in syn. 1845. Verbena cinerascens Schau. in A. DC., Prodr. 11: 545. 1847. Citharexylum alpinum Poepp. ex Schau. in A. DC., Prodr. 11: 545, in syn. 1847. Verbena spartioides Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 195. 1863. Verbena spartioides Turcz. ex Moldenke, Alph. List Invalid Names 50, in syn. 1942. Citharexylon andinum Poepp. ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960 [not Citharexylum andinum Moldenke, 1934].

Literature: Walp., Repert. Bot. Syst. 4: 16 & 78. 1845; Schau. in A. DC., Prodr. 11: 545 & 614. 1847; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 195. 1863; Jacks., Ind. Kew. 2: 1179. 1895; Reiche, Fl. Chile 5: 282—283. 1910; Moldenke, Revist. Sudam. Bot. 5: 1. 1937; Moldenke, Geogr. Distrib. Avicenn. 28. 1939; Moldenke, Prelim. Alph. List Invalid Names 16 & 45. 1940; Moldenke, Lilloa 5: 386. 1940; Moldenke, Alph. List Invalid Names 14, 46, & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 92. 1942; Moldenke, Alph. List Cit. 1: 190, 230, & 262. 1946; E. J. Salisbury, Ind. Kew. Suppl. 10: 76. 1947; Moldenke, Alph. List Cit. 2: 411 (1948), 3: 686, 700, 823, & 843 (1949), and 4: 1062 & 1098. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100 & 185. 1949; Moldenke, Résumé 120, 255, 362, 374, & 454. 1959; Moldenke, Résumé Suppl. 1: 23 & 25 (1959) and 2: 5 & 8. 1960.

Small shrub, to 2 m. tall, with erect habit, very much branched; branches and branchlets acutely tetragonal, twiggy, erect, the angles more or less margined, the young parts and twigs densely white-pubescent with closely appressed strigose hairs or sometimes spreading-subtomentose on vigorous shoots, glabrescent in age; twigs numerous, short, slender, acutely tetragonal, densely white-pubescent except on the angles; principal internodes 1—3.5 cm. long; nodes distinctly annulate, often slightly contracted, usually bearing a pair of opposite, stipule-like, stramineous or scarious, triangular scales on larger branchlets, these actual petiole-bases often united by a narrow annular membrane; leaves decussate-opposite, remote, caducous, the uppermost

sessile, the lower and larger ones short-petiolate; petioles, when present, very slender, 1--2.5 mm. long, sparsely strigillose, dilated and discolored at the base and decurrent into the branchlet-angles; leaf-blades chartaceous, linear or oblong-lanceolate to narrow-elliptic, small, 4--25 mm. long, 1--8 mm. wide, acute or subacute at the apex, acute or acuminate at the base and more or less narrowed into the petiole, often slightly falcate, the margins entire and usually revolute, uniformly green on both surfaces, brunneous or nigrescent in drying, sparsely white-strigillose or strigose-hirtous on both surfaces; midrib and lesser venation indiscernible above and obscure beneath, under a hand lens a very slender midrib and several very short secondaries may be discerned beneath and found to be slightly prominent; inflorescence terminal, spicate, 3--10 cm. long; spikes often few-flowered, usually loosely-flowered, usually about 2.5 cm. long, the flowers in several to many opposite pairs, each pair subtended by a pair of small linear-oblong sessile bracts resembling the leaves in all respects but smaller, about 1/3 as long as the calyx; peduncles and rachis continuous with the twigs and similar in all respects, the peduncle and sympodia mostly about the same length as the internodes just below, occasionally the spikes contracted, sympodia abbreviated, and flowers crowded even in anthesis (as they always are in bud at the tips of not fully matured spikes); flowers sessile, with the fragrance of heliotrope (Heliotropium arborescens L.); calyx about 4 mm. long, half as long as the corolla-tube, its rim unequally and acutely 5-dentate; corolla varying from blue, lilac, or lavender to white or white with a pink tinge, sometimes rose-colored, yellow in the center, its tube subinfundibular, slightly recurved, twice as long as the calyx, the limb rather large, 5-parted, spreading.

The species is found on rocky slopes, in rocky sunny places, and on steep dry hillsides, from 750 to 2010 meters altitude, and is called "heliotropo silvestre" locally. It has been found in anthesis from July to November, and in fruit in November. The species is based on C. Gay 944 and s.n. and on Poeppig 9, II.85, and s.n., the first two of these from Coquimbo, Chile, and the last three from Rio Colorado to La Guardia de los Horillos, Chile. Poeppig 9 is also the type collection of Citharexylon andinum Poepp.; it bears a label reading: "No. 9 Citharexylon andinum Poepp. Diar. 558", apparently a reference to page 558 in Poeppig's original diary. Walpers cites II.85 and 9 as Verbena scoparia Gill. & Hook. and reduces the names Citharexylon alpinum alpinum and Citharexylum? alpinum to that species. The type of Verbena spartioides is MacRae 43 [826] from Cumbre, Aconcagua, Chile.

Wagenknecht describes the species as "scarce", while Worth & Morrison note that it is mostly in seed in November. The Grandjots report that it grows from 900 to 2010 meters altitude in Coquimbo -- their no. 185n bears a note to see no. 133n, but I

have not as yet been able to see the latter number.

In all, 26 herbarium specimens, including the types of all the names involved, and 6 mounted photographs have been examined.

Citations: CHILE: Aconcagua: MacRae 43 [826; Cumbre, 1825] (K, Z—photo). Atacama: Poeppig 9 [Macbride photos 7855, in part] (Kr—photo of cotype, N—photo of cotype); II.85 (P—cotype). Coquimbo: Biese 1778 (N, S), 1827 (N), 1885 (N, S); C. Gay 944 (P—cotype), s.n. [1839; Macbride photos 7855, in part] (E—photo of cotype, K—cotype, Kr—photo of cotype, N—cotype, N—photo of cotype, N—cotype, P—cotype, P—cotype); Grandjot & Grandjot 185n (N); W. H. Harvey s.n. [Coquimbo, July--August 1856] (K, N, S); Wagenknecht 18421 (Ca--656099), s.n. [Herb. Looser 4022] (N); Worth & Morrison 16497 (Ca--636382). Ovale: Claude-Joseph 4996 (W--1422118). Santiago: Looser 5510 (N). Valparaiso: Bridges s.n. [Valparaiso] (K). Province undetermined: C. Elliott 220 [Jahuel] (K, N); E. C. Reed s.n. (K).

DIOSTEA JUNCEA (Gill. & Hook.) Miers, Trans. Linn. Soc. Lond. Bot. 27: 103--104, pl. 28. 1870.

Synonymy: Verbena juncea Gill. & Hook. in Hook., Bot. Misc. 1: 162. 1829. Lippia juncea Schau. in A. DC., Prodr. 11: 573. 1847. Verbena juncea Hook. & Gill. ex Schau. in A. DC., Prodr. 11: 556, in syn. 1847. Dipyrena valdiviana R. A. Phil., Linnaea 29: 21--22. 1857. Dipyrena dentata R. A. Phil., Linnaea 29: 22. 1857. Lippia scirpea R. A. Phil., Linnaea 33: 196. 1864. Priva dentata R. A. Phil. ex Miers, Trans. Linn. Soc. Lond. Bot. 27: 104, in syn. 1870. Diostea stenophylla Miers, Trans. Linn. Soc. Lond. Bot. 27: 105. 1870. Diostea filifolia Miers, Trans. Linn. Soc. Lond. Bot. 27: 106. 1870. Diostea scirpea Miers, Trans. Linn. Soc. Lond. Bot. 27: 107. 1870. Diostea valdiviana Miers, Trans. Linn. Soc. Lond. Bot. 27: 107. 1870. Diostea infusata Miers, Trans. Linn. Soc. Lond. Bot. 27: 107--108. 1870. Lippia juncea Gay ex Miers, Trans. Linn. Soc. Lond. Bot. 27: 107. 1870. Baillonia juncea Benth. in Benth. & Hook. f., Gen. Pl. 2: 1144. 1876. Baillonia juncea Benth. & Hook. f. ex Jacks., Ind. Kew. 1: 264. 1893. Citharexylum germaini Briq., Bull. Herb. Boiss. 4: 342--343. 1896. Diostea chamaedryfolia Hort. ex Hook. f. in Curtis, Bot. Mag. 126: pl. 7695. 1900. Baillonia juncea Benth. & Hook. ex Junell, Symb. Bot. Upsal. 4: 31. 1934. Diostea juncea Miers ex Junell, Symb. Bot. Upsal. 4: 31. 1934. Lippia juncea (Miers) Gill. & Hook. ex Junell, Symb. Bot. Upsal. 4: 210. 1934. Verbena juncea Gill. apud Latzina, Lilloa 1: 189, in syn. 1937. Baillonia juncea (Gill. & Hook.) Benth. ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Baillonia juncea (Gill. & Hook.) Benth. & Hook. f. ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940. Baillonia glauca Elliott ex Moldenke, Prelim. Alph. List Invalid Names

6, in syn. 1940. Citharexylon germaini Briq. ex Moldenke, Prelim. Alph. List Invalid Names 15, in syn. 1940. Diostea valdiviana (R. A. Phil.) Miers ex Moldenke, Prelim. Alph. List Invalid Names 24, in syn. 1940. Dipyrena juncea Griseb. ex Moldenke, Prelim. Alph. List Invalid Names 24, in syn. 1940. Lippia juncea (Gill. & Hook.) Schau. ex Moldenke, Prelim. Alph. List Invalid Names 31, in syn. 1940. Verbena scirpea R. A. Phil. ex Moldenke, Prelim. Alph. List Invalid Names 48, in syn. 1940. Junellia scirpea (R. A. Phil.) Moldenke, Prelim. Alph. List Invalid Names 48, hyponym. 1940. Baillonia juncea Sch. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947. Lippia juncea Gill. & Hook. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Diostea juncea Schau. ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960. Diostea valdiviana Phil. ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960. Dipyrena juncea (Gill.) Hook. ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960.

Literature: Hook., Bot. Misc. 1: 161—162, pl. 47. 1829; Schau. in A. DC., Prodr. 11: 556 & 573. 1847; C. Gay, Fl. Chile 5: 30. 1849; R. A. Phil., Linnaea 29: 21—22. 1857; R. A. Phil., Anal. Univ. Chil. 2: 402. 1862; R. A. Phil., Linnaea 33: 196. 1864; Miers, Trans. Linn. Soc. Lond. Bot. 27: 103—108, pl. 28. 1870; Benth. in Benth. & Hook. f., Gen. Pl. 2: 1144. 1876; F. Phil., Cat. Pl. Vasc. Chil. 217. 1881; Jacks., Ind. Kew. 1: 264, 768, & 777 (1893), 2: 95 & 96 (1894), and 2: 1179. 1895; Briq., Bull. Herb. Boiss. 4: 342—343. 1896; Hook. f. in Curtis, Bot. Mag. 126: pl. 7695. 1900; Speg., Anal. Soc. Cient. Argent. 53: 242. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 23 & 61. 1904; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patagonia 8 (2): 691. 1905; Reiche, Fl. Chile 5: 298. 1910; Bean, Trees & Shrubs 1: 495. 1914; Hosseus, Trab. Inst. Bot. & Farm. Cienc. Med. Buenos Aires 33: 67. 1915; Rothkugel, Bosques Pat. 194. 1916; Sanzin, Anal. Soc. Cient. Argent. 88: 103—104. 1919; J. W. C. Kirk, Brit. Flow. Gard. 433. 1927; Stapf, Ind. Lond. 2: 501 and 4: 125. 1930; Junell, Symb. Bot. Upsal. 4: 31, 32, 37, 178, & 210, fig. 54 & 55. 1934; Latzina, Trab. Inst. Bot. & Farm. Cienc. Med. Buenos Aires 54: 79. 1935; H. S. Marshall, Kew Bull. 1936: 87. 1936; Moldenke in Fedde, Repert. Sp. Nov. 41: 62. 1936; Latzina, Lilloa 1: 189. 1937; Moldenke, Alph. List Common Names 26. 1939; Moldenke, Geogr. Distrib. Avicenn. 29 & 39. 1939; Moldenke, Prelim. Alph. List Invalid Names 6, 15, 24, 31, & 48. 1940; Moldenke, Suppl. List Invalid Names 4, 6, & 12. 1941; Moldenke, Alph. List Invalid Names 6, 13, 14, 23, 27, 31, 32, & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42, 43, 73, & 92. 1942; Moldenke, Lilloa 10: 369. 1944; Moldenke, Phytologia 2: 102. 1944; Darlington & Janaki Annal, Chromosome Atl. 271. 1945; Moldenke, Alph. List Cit. 1: 16, 28, 34, 38, 59, 76, 77, 80, 88, 101, 105, 120, 123, 135, 136, 190, 230, 233—235, 247, 265, 316, & 326. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 2, 9, & 14. 1947; Moldenke, Alph. List Cit. 2: 348, 350, 368, 389, 415, 416, 425, 437, 441, 446, 498, 554, 555, 565, 576, & 640 (1948),

3: 667, 671, 700, 722, 731, 735, 748, 750, 767, 798, 812, 813, 823, 843, 848, 894, 917, & 951 (1949), and 4: 980, 1030, 1049, 1050, 1056, 1064, 1067, 1068, 1071, 1104, 1115, 1116, 1128, 1187, 1191, 1199, & 1209. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 100, 103, 160, & 185. 1949; Rehd., *Bibl. Cult. Trees* 583. 1949; Moldenke, *Journ. Calif. Hort. Soc.* 15: 84. 1954; Boelcke, *Revist. Invest. Agric.* 11: 27, 87—88, fig. 27C, & 96. 1957; Moldenke, *Phytologia* 6: 254 & 255. 1958; Moldenke, *Résumé* 120, 123, 218, 236, 253, 256, 278, 301, 313, 317, 340, 367, 374, & 454. 1959; Moldenke, *Résumé Suppl.* 2: 5 & 8. 1960.

Illustrations: C. Gay, *Hist. Fis. Chile Bot.* 5: [30]. 1849; R. A. Phil., *Anal. Univ. Chil.* 35: 193. 1870; Miers, *Trans. Linn. Soc. Lond. Bot.* 27: pl. 28. 1870; Hook. f. in Curtis, *Bot. Mag.* 126: pl. 7695 (colored). 1900; Briq., *Ann. Conserv. & Jard. Bot. Genève* 4: [22]. 1900; Bean, *Trees & Shrubs* 1: 495. 1914; Sanzin, *Anal. Soc. Cient. Argent.* 88: 104. 1919; Junell, *Symb. Bot. Upsal.* 4: fig. 54 & 55. 1934; Boelcke, *Revist. Invest. Agric.* 11: 87, fig. 27C. 1957.

Much-branched tall shrub, bush, or tree, with straggling growth, 1—5 m. tall, sometimes giving the appearance of a perennial herb, with broom-like habit; stems woody, gray; branches and branchlets slender, ascending, terete or subterete, twiggy, longitudinally many-striate, glabrous, shiny, stramineous or brownish in drying, not nigrescent; twigs mostly minutely puberulent; pith large, round; principal internodes 1.7—8.5 cm. long; nodes distinctly annulate and contracted, often minutely puberulent, those on the older branches usually bearing a pair of scarious or stramineous triangular closely appressed scales which are the expanded petiole-bases; leaves decussate-opposite, more persistent (less pronouncedly caducous) than in the other species of the genus, often numerous, rather uniformly shiny-green on both surfaces, petiolate, not nigrescent in drying; petioles slender, 1—4 mm. long, minutely puberulent and ciliolate-margined, or glabrescent, thickened and expanded at the base in age, the base persisting on older nodes after the blades and upper portion of the petiole have fallen off, these bases being to 4 mm. long and wide, stramineous, incrassate, appressed or patent; leaf-blades somewhat fleshy when fresh, chartaceous and brittle when dried, oblanceolate or elliptic, rarely lanceolate, 0.6—3 cm. long, 2—9 mm. wide, acute at the apex, cuneately attenuate or acute at the base, entire or sparsely dentate above the middle or near the apex, rarely dentate from the base to the apex, minutely and very obscurely pulverulent-puberulent or glabrate on both surfaces, the teeth coarse, triangular, acute, antrorsely spreading; midrib slender and impressed (especially at the base) above, rather broad and flattened or subprominent beneath; secondaries very slender, 2—5 pairs, very short or some more elongate and leading to the apex of the teeth, ascending; inflorescence spicate, terminal or sometimes also axillary; spikes densely many-flowered, numerous, 1.3—8 cm. long, 1.5—2 cm. wide during anthesis, sessile or short-pedunculate; peduncles (when present) not continuous with the twigs, very slender, much more slender than the ad-

jacent twig, densely short-pubescent with gray spreading hairs; rachis similar to the peduncles in texture and pubescence, with greatly abbreviated and numerous sympodia; flowers borne in pairs or whorls on the rachis, crowded, fragrant, nigrescent when dry, the calyx erect, but the corolla curving downwards; bracts and bractlets apparently obsolete; pedicels scarcely 2 mm. long; prophylla scale-like, ovate or oblong, 3--4 mm. long or often only half as long as the calyx, 1.5--2 mm. wide, acute or mucronate at the apex, subcuneate at the base, often with a carinate midrib, puberulent; calyx short, membranous or submembranous, often very thin-textured, sometimes somewhat fleshy, cylindric before anthesis, later becoming campanulate-tubular or ovate-inflated, 4--6 mm. long, 5-nerved, often constricted at the apex, subrugulose, varying from puberulent or subpilosulous to pubescent or short-pilose, especially toward the base, usually finally glabrous and shiny, the rim obliquely 5-dentate, the teeth small, unequal, triangular or long-subulate with excurrent veins, often pilose on the inner surface, the shorter one posterior; corolla exerted from the calyx, often very thin-textured, usually 3--4 times as long as the calyx, subhorizontal, curvate, varying from white or bluish-white to clear-blue, pale-lilac, or rosy, usually at first blue or violet and later turning white, often sulphur-yellow with black veins when dry, the tube subinfundibular, 5--8 mm. long, sometimes twice as long as the calyx or exceeding the calyx-rim by 7 mm., cylindric at the base, ampliate beneath the apex, somewhat contracted beneath the limb, somewhat incurved, parallel-veined, glabrous or puberulent on the outer surface, hirsute within from the apex to below the middle with long white retrorse hairs, the limb 4- or 5-parted, obovate-rotund, about 8 mm. wide, the upper lobe deeply bifid, the lobes very short, oblong, patent, 1--2.5 mm. long, entire-margined, subemarginate at the apex, the upper ones somewhat broader; stamens rather short, didynamous, inserted in the lower third of the corolla-tube, included, the upper ones inserted lower and with shorter filaments than the lower ones; filaments glabrous, the upper ones about 1.2 mm. long, the lower ones about 2 mm. long; anthers ovoid, about 1 mm. long; the fifth stamen sterile, sometimes anantherous, sometimes very short and anantherous or even lacking, sometimes antheriferous; style rarely surpassing the corolla-mouth, longer than the stamens or sometimes scarcely surpassing the lower ones, usually equaling the corolla-mouth, thickened at the apex, obscurely bilobed, glabrous; stigma punctiform; ovary 2-celled, each cell 1-ovulate; raphe ascending, terminating in an apical chalaza; fruiting-calyx persistent, rather fleshy, including the fruit, glabrous; fruit drupaceous, about 2.5 mm. long and 1.5 mm. wide, black and polished, usually 2-seeded, sometimes 4-seeded; nutlets dark-colored, hard, corneous, 1-celled.

This species inhabits the Andes Mountains, being found on dry river terraces, in open rocky slopes, on lake shores, and in the subalpine montane region, at altitudes of 160 to 1900 meters. It has been collected in anthesis from October to March and in July, and in fruit in December, February, and March. Common names are

"retama" and "retamo". Bullock reports that the Amerind name is "cau-cau-mamill" and the Chilean name is "retamilla". After flowering and fruiting the naked rachis and peduncles often persist at the terminations of the branchlets or in their furcations. The branches are often covered with tiny yellow elongate insect eggs. The leaf-blades seem to drop off readily in the dry season and photosynthesis is then carried on by the green branches and petiole-bases. Good fruit is seen on Comber 553, Lechler 615, and Werdermann 545. Sometimes 3--5 spikes are clustered at the apex of a branchlet -- one terminal and the others axillary in the axils of the uppermost pair of leaves or petiole-bases (cfr. Werdermann 545 at Kew). Comber 553 (from a wild plant) shows part of a heavy stem. This collector reports that the plant is a loose growing shrub "which may be good [in cultivation] when in full flower". Ball describes it as a shrub with the habit of Spartium junceum L.

Leaves that are coarsely but regularly dentate from the base to the apex are seen on Comber 553, cultivated in England, and on some specimens of wild material including the sheet of wild material of the same number from which seeds were taken to raise the cultivated specimens. Mostly, however, the leaves have only a few teeth above the middle or at the apex or else are entire. All three types of leaves are seen on some specimens, including Comber 553.

The Herb. Hort. Kew s.n. [June 16, '99], cited below from the Kew herbarium, is the specimen from which Bot. Mag. pl. 7695 was drawn. This plate is accompanied by an excellent and important discussion of the species. Gillies & Hooker mention two forms of the species: one with entire leaves and pubescent spikes, from near La Guardia in the valley of the Río Aconcagua, and the other with coarsely serrate leaves and glabrate spikes, from the Río del Diamante south of Mendoza. I regard the former as the type of the species (the isotype in the British Museum herbarium is labeled "var. α fol. integ."). The type of D. infuscata is C. Gay s. n. [Río Negro] in the Hooker Herbarium at Kew. The type of D. filifolia is a Germain collection from the Cordillera de Santiago in the Chilean Andes, deposited in the Miers and in the Hooker herbaria. D. stenophylla is based on Bridges 459 in the Miers herbarium, Cuming 292 in the Hooker and British Museum herbaria, and Bridges 1220, all from the Chilean Andes. The type of Lippia scirpea is a collection of W. Diaz from Paso de los Piuquenes, Chile, in the Philippi herbarium. Dipyrena valdiviana was based on C. Gay 174 and 381 from near Osorno, Valdivia, Chile; Miers cites Lechler 615 from Huiti, Valdivia, as this species. Philippi 781 and s.n. [Cord. d. Linares] are both labeled "Dipyrena dentata Ph.", but are apparently not the type collection -- the species being based on R. A. Philippi s.n. [Herb. Gay 2005]. The type of Citharexylum germaini is Ph. Germain s.n. from the Cordillera de Maule, Chile, deposited in the Delessert Herbarium at Geneva.

Moon points out that this specimen represents an entirely different genus from Baillonia Bocq., with which it has been confused - "My Coimbra specimen will convince anyone".

Boelche says of this species "Arbusto de unos 3--4 m de altura, que puede ser muy frecuente en la zona intermedia entre bosque y estepa. A menudo se observa que las plantas han sido ramoneadas con cierta intensidad en las partes inferiores que se hallan al alcance de los animales." Miss Mexia describes it as "common" at 1500 meters altitude in Curicó, and Aravena also calls it "common" in Curicó. Morrison, however, says that it is "not common on steep dry rocky west-facing slope in sparse chaparral" in Santiago. Junell reports that the species has a chromosome complement of $2n = 32$.

Specimens of this species have been misidentified in herbaria as Citharexylon alpinum Poepp., C. elegans Phil., Dipyrena glaberrima Hook., Lantana sp., Rhaphithamnus longiflorus Miers, Verbena ephedroides Cham., V. scoparia Hook., V. scoparia Gill. & Hook., and Verbena sp. Germain called it Verbena spathulata Gill., Philippi was of the opinion that it is the same as Dipyrena glaberrima (Gill. & Hook.) Hook., while Briquet compared it with Citharexylum berlandieri B. L. Robinson, with which it certainly hasn't the faintest resemblance. Junell, after studying the gynoeceum morphology, came to the conclusion that Diostea juncea is actually a Lippia, and that D. scoparia is actually a Verbena. Personally, I feel that it would be far from the biologic truth of the situation to separate these two obviously very closely related species so widely! The separate genus, Diostea, to hold the three species described herein, is much to be preferred.

The date of publication of Verbena juncea Gill. & Hook. in Hooker's Bot. Misc. is given as "1830" in Curtis, Bot. Mag. 126: pl. 7695 (1900) and by Rehder, Bibl. Cult. Trees (1949), but was actually 1829 according to H. S. Marshall in Kew Bull. 1936: 87 (1936). The name Baillonia juncea is usually accredited to "Benth. & Hook. f.", but is more accurately accredited to Bentham alone — Hooker himself so accredits it in Curtis, Bot. Mag. 126: pl. 7695 (1900), where he definitely states "Bentham, who elaborated the Verbenaceae for the 'Genera Plantarum'". It is accredited correctly also by Thiselton-Dyer, Ind. Kew. Suppl. 2: 23 (1904). Miers cites Dipyrena valdiviana to Linnaea 29: 31, but the plant is actually described on pages 21--22 of that volume, not on page 31.

In all, 181 herbarium specimens, including the types or phototypes of all the names involved, and 20 mounted photographs have been examined.

Citations: CHILE: Acancagua: Ball s.n. [1882] (K); Claude-Joseph 2532 (W--1189251); Gillies s.n. [near La Guardia] (Bm--isotype, K--type, N--photo of type, Z--photo of type); Looser 4005 (N); MacRae s.n. [Cumbre Pass] (Br, K); Poeppig II.84 (B, Bm, P). Atacama: Herb. Mus. Nac. Santiago 18 (N); Philippi & Borchers s.n.

[Baños, Chillam, Francas, 10/1/83] (Bm), s.n. [Río Colorado, Los Andes, 10/1/86] (Bm); Poeppig 557 (V, X), s.n. [Andes, Novbr. 1927] (E--117468). Bio-Bío: Neger s.n. [Copahue] (Mu--3970). Cautin: Morrison & Wagenknecht 17509 (Ca--636398). Curicó: Aravena 33375 (Ca--13805); Mexia 7878 (F--1010962, Go, N, S); Werdermann 545 (B, Ca--278746, G, Gg--129907, K, N, S, W--1541061), 1668 (B). Linares: A. Philippi 781 (B); R. A. Philippi s.n. [1861] (X). Llanquihue: Reiche s.n. [Thal des ob. R. Manso, II.96] (B, B, F--639982). Malleco: Looser 2743 (N). Maule: C. Gay 381 (N--photo, P, Z--photo); Germain s.n. [Cordilleres de Maule, 1855] (Bm, Cb, Cb, E--photo, K, N--photo, N--photo, S--photo, W--photo, X, Z--photo). Nuble: Behn s.n. [7-12-1945] (N); Berninger 187a (B). Santiago: Caldeleux s.n. [Santiago de Chili] (Cb); G. T. Hastings 367 (Ca--66366, It, W--530274); Looser 4006 (N); J. L. Morrison 16781 (Ca--632897, S); R. A. Philippi s.n. [Herb. C. Gay 2005; Herb. Mus. Nac. Hist. Nat. Chile 42412] (N--photo); Skottsberg & Sparre 11069 (S). Talca: R. A. Philippi s.n. [Talca, 1888] (B, K, W--1322925). Valdivia: D. S. Bullock s.n. [Catri-pulli, 28 Feb. 1905] (Bm); Claude-Joseph 2719 (W--1198651); C. Gay 174 (E--photo, N--photo, P, Z--photo), s.n. [Río Negro] (K, N--photo, Z--photo); Hollermayer 554 (B), 1376 (B, K, N, W--1472375), s.n. [Werdermann 1376] (Ca--323107, E--940229, Gg--149918, S); Lechler 615 (B, Bm, K, N, N--photo, Ol, P, S, S, Si--photo, X, Z--photo); R. A. Philippi 807 (Bm, L, P, S), s.n. [Valdivia, 1862] (Cb, X), s.n. [Valdivia, 1876] (B, B), s.n. [Andes de Valdivia, 1888] (B), s.n. (K). Valparaíso: Bridges 460 (Bm, K, K), s.n. (K); Cuming s.n. [Valparaíso] (Cp). Province undetermined: Bridges 45 (B), s.n. (Br); Claude-Joseph 5805 [Curarehue] (W--1498937); Comber 553 [Rengoli] (Ed, K, K); Cuming 225 [Cordilleras] (Bm, Ed, K, K), 261 (Bm, Ed, K, K); W. Diaz s.n. [Herb. Mus. Nac. Hist. Nat. Chile 42407] (N--photo); C. Elliot 221 [Río Blanco] (K); G. F. S. Elliot 420 [Río Blanco] (B, Bm, Ed); C. Gay 943 (P), s.n. [Baper Cordilleres, 1833] (Cb), s.n. (Cb, F--998388, P); Germain s.n. [Quilatta] (K); MacRae s.n. [Cordillera] (K); E. C. Reed s.n. [Semita] (K); Sargent s.n. [near Baths of Tolanca, Río Blanco, Jan. 16, 1905] (A, Pr); Wilczek 39 [Val. Tuiguiritica] (Cb). ARGENTINA: Chubut: Castellanos s.n. [Herb. Inst. Miguel Lillo 118404] (S); Illin 102 (Br, Ca--50435, N, Sp--24005), 112 (Ca--149579), s.n. [Stuckert 18204] (Cb); Martinez Crovetto 3210 (N); T. Meyer 9648 (S); Soriano 1372 (N). Mendoza: Herb. Miers s.n. [Villa Vicencio, Paramó de Mendoza] (Bm); Moseley s.n. [Sta. Rosa de los Andes to Uspallata Pass] (Bm, K); R. A. Philippi s.n. [Andes Mendocinae] (B, B). Neuquen: Scolnik 218 (W--2045579). Río Negro: Buchtien s.n. [Baenitz 1346; Herb. Osten 5892; San Carlos de Bariloche, 6/II/1905] (Cb, Ed, Ed, F--495370, G, La, Le, Le, Mu--4169, N, Ol, S, Ug, W--

1177975); Burkart 6529 [Herb. Mus. Argent. Cienc. Nat. 12348] (N); Cabrera & Job 54 (N, S), 313 (N); Chicchi 226 (N); Cordini 107 (N), 254 (W—1617527); De Barba 933 (N), 1161 (N), 1408 (N), 1436 (N), 1494 (N); Ljungner 137 (Go), 675 (Go, N); T. Meyer 7472 (N), 7849 (S); Parodi 11389 (G); Teague s.n. [9-XII-1946] (N, S). Santa Cruz: Moreno & Tonini 341 (N). CULTIVATED: California: Walther s.n. [Golden Gate Park, July 1933] (A, Gg—204283), s.n. [Golden Gate Park, May 1935] (Gg—222616). England: W. J. Bean s.n. [Arb. Kew. 1-6-20] (A); C. H. Grey s.n. (N); Herb. Hort. Kew. s.n. [June 16, 1899] (K); Hort. Nymans s.n. [1929; from seeds of Comber 553] (K).

DIOSTEA SCOPARIA (Gill. & Hook.) Miers, Trans. Linn. Soc. Lond. Bot. 27: 104--105. 1870.

Synonymy: Verbena scoparia Gill. & Hook. in Hook., Bot. Misc. 1: 161, pl. 47. 1829. Verbena scoparia Hook. & Gill. ex Miers, Trans. Linn. Soc. Lond. Bot. 27: 104, in syn. 1870. Diostea scoparia Miers ex Jacks., Ind. Kew. 1: 768. 1893. Lippia aphylla R. A. Phil., Anal. Univ. Chile 90: 623. 1896. Verbena scoparia Hook. ex Moldenke, Alph. List Invalid Names Suppl. 1: 26, in syn. 1947. Verbena scoparium Gill. & Hook. ex Moldenke, Résumé Suppl. 2: 13, in syn. 1960.

Literature: Hook., Bot. Misc. 1: 161, pl. 47. 1829; Walp., Repert. Bot. Syst. 4: 16 & 78. 1845; C. Gay, Hist. Fis. Chile Bot. 5: [20]. 1849; Schau. in A. DC., Prodr. 11: 544. 1849; R. A. Phil., Anal. Univ. Chil. 35: 192. 1870; Miers, Trans. Linn. Soc. Lond. Bot. 27: 104--105. 1870; Griseb., Symb. Fl. Argent. 276. 1879; Jacks., Ind. Kew. 1: 768 (1893) and 2: 1179. 1895; R. A. Phil., Anal. Univ. Chil. 90: 623. 1896; Reiche, Fl. Chile 5: 282. 1910; Skottsberg, Kungl. Svensk. Vetens. Handl. 56 (5): 292. 1916; Sanzin, Anal. Soc. Cient. Argent. 88: 122--123. 1919; Stapf, Ind. Lond. 6: 431. 1931; Junell, Symb. Bot. Upsal. 4: 11--13, 15, & 37, fig. 7. 1934; Moldenke, Geogr. Distrib. Avicenn. 29. 1939; Moldenke, Lilloa 5: 388--389. 1940; Moldenke, Prelim. Alph. List Invalid Names 48. 1940; Moldenke, Suppl. List Common Names 6 & 7. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Alph. List Invalid Names 29 & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42, 43, & 92. 1942; Moldenke, Lilloa 10: 369. 1944; Moldenke, Phytologia 2: 102. 1944; Moldenke, Alph. List Cit. 1: 59, 96, 120, 131, 135, 166, 190, 230, 233, 235, 251, & 276. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 26. 1947; Moldenke, Alph. List Cit. 2: 367, 369, 372, 443, 504, 535, 537, 599, & 600 (1948), 3: 671, 731, 750, 772, 781, 802, 813, 843, & 910 (1949), and 4: 1070, 1090, 1115, 1187, & 1191. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100, 103, & 185. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 6. 1949; Moldenke, Phytologia 6: 255. 1958; Moldenke, Résumé 120, 123, 278, 310, 374, & 454. 1959; Moldenke, Résumé Suppl. 2: 8 & 13. 1960.

Illustrations: Hook., Bot. Misc. 1: pl. 47. 1829; Sanzin, Anal.

Soc. Cient. Argent. 88: 123. 1919; Junell, Symb. Bot. Upsal. 4: fig. 7. 1934.

Bush or shrub, to 1.5 m. tall; stems rather glaucous-ribbed; branches and branchlets Ephedra-like, terete or subterete, erect, longitudinally many-striate or sulcate, green when fresh, nigrescent in drying, very twiggy, especially above, glabrous throughout or very minutely and obscurely pulverulent; twigs abundant, erect, often clustered above, turning abruptly upwards, often parallel with the branchlets, straight and stiff, very minutely and obscurely puberulent; nodes distinctly annulate, often slightly contracted, on larger branches bearing a pair of small opposite scale-like organs (morphologically the petiole-bases) which are scarious or stramineous, appressed or spreading, triangular, 1 mm. long or less, often connected with each other by a narrow scarious membrane, glabrous; principal internodes 1--6 cm. long; leaves very small, decussate-opposite, caducous, seldom seen on dried material; petioles very short and slender, amplate at the base, the base persisting after the rest of the leaf has fallen, forming a more or less thickened scale-like organ; leaf-blades thick, varying from linear-oblong or elliptic to obovate or spatulate, 3--4 mm. long, about 2 mm. wide, obtuse or acute at the apex, cuneate at the base, glabrous on both surfaces, nigrescent, entire or obscurely subdentate with 1 or 2 tiny teeth near the apex; midrib and other venation indiscernible on both surfaces; inflorescences terminal, spicate, often terminating every twig; spikes 1.5--6.5 cm. long, 1--2 cm. wide during anthesis, densely many-flowered, sessile or very short-pedunculate, the peduncle and rachis not continuous with the twigs but not differing noticeably from them until after the fruits have fallen when they turn dry and light-gray, minutely puberulent like the twigs and similar to them in all respects but abruptly more slender, or glabrous; flowers arranged in many opposite pairs, usually crowded, appressed or spreading, fragrant or strong-scented, sometimes erect; sympodia (except sometimes the lowermost) much abbreviated; prophylla small, ovate or subovate, scale-like, appressed, persistent, acute or acuminate at the apex or subulate, from less than 2 mm. to half as long as the calyx, rigidly puberulent; pedicels short or very short; calyx erect, 4--6 mm. long, plicate and 5-angled, short-tubular or cylindric, rigidly puberulent or subpuberulent, later glabrescent, the rim shortly 5-dentate, the teeth subulate, unequal, the posterior one shorter; corolla subinfundibular, spreading or bending downwards, varying from pale-pink or rose to lilac, clear-lilac, or violet, sometimes blue or white, nigrescent in drying, often with the tube pink and the lobes dingy-white, usually about 4 times as long as the calyx, glabrous on the outside, its tube about 8 mm. long or twice as long as the calyx, cylindric at the base, varying from recurved or slightly incurved to curving sigmoidly outwards, amplate above, slightly swollen beneath the mouth, parallel-veined, retrorsely pilose on the anterior side on the inner surface, the throat villosulous, the limb 5-parted, rather large, expanded, the lobes oblong, about 2 mm. long, slightly wider above, subemarginate at the apex; stamens included; fila-

ments very slender-filiform; anthers sagittate, acuminate; stam-inode sterile, anantherous, very distinct but easily overlooked because of its tenuity; style scarcely exerted, usually just equaling the corolla-mouth, dilated and curved at the apex; ovary 2- or 4-celled; fruit 2- or 4-seeded, subequaling the calyx, long, narrow, schizocarpous.

The type of this very distinct species was collected by John Gillies in valleys near Villavicencio, Mendoza, Argentina, on February 28, 1821, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. Another unnumbered collection in the Lund herbarium, labeled merely "Andes of Chile and Mendoza" is probably part of the same collection or may be a cotype collection. The type of Lippia aphylla was collected by Augusto Borchers, the ornithologist, at Campana de Quillota, Aconcagua, Chile, in 1884.

The species is said to inhabit barrancas, steep rocky slopes, mountains, lake shores, rocks near rivers, and the edges of highways, growing at altitudes from 200 to 2700 meters. It has been collected in anthesis from September to March and in May, and in fruit in January. If the fruits as preserved in a packet in the Britton Herbarium at the New York Botanical Garden are actually from this plant, they are quite different from those of D. juncea, being long, narrow, and schizocarpous as in Bouchea Cham. Fruit is apparently seldom seen, certainly seldom collected, but the characters of the rachis and the pronounced nigrescence of the plant and usual absence of leaves easily distinguish it from D. juncea. It is described by Nicora as very common in parts of Mendoza. Vernacular names are "clavello [=pink] del campo", "clavellilo del campo", "escobilla [=broom] del campo", and "verbena". Specimens have been misidentified in herbaria as Lippia sp., Verbena aphylla Gill. & Hook., V. ephedroides Cham., and V. juncea Gill. & Hook.

Walpers places Citharexylon alpinum Poepp. and Citharexylum ? alpinum Poepp. in the synonymy of this species, but these names properly belong in the synonymy of D. cinerascens, as indicated by Schauer. Schauer cites Bridges 47 and J. Style s.n. from the Chilean Andes, but I have not as yet seen these collections. Someone has appended a note to the sheet of Reed 175: "Diostea scoparia Miers, but a true Verbena, ovary 4-celled". Junell agrees with this statement.

In all, 72 herbarium specimens, including the types or phototypes of all the names involved, and 5 mounted photographs have been examined.

Citations: CHILE: Aconcagua: Borchers s.n. [Campana de Quillota, 1884; Herb. Mus. Nac. Chile 54829] (N--photo); Buchtien s. n. [Junca, Uspallata Pass, 33° S. lat., 2.2.1903] (N, S); C. Elliot 158 (K, N); Philippi & Borchers s.n. [Cerro Campana, 15/11/84] (Bm). Colchagua: Meyen s.n. [Cord. de St. Fernando, 3/31] (Br, K). Coquimbo: Looser 2207 (N); Worth & Morrison 16692 (Ca--633189, S). Santiago: Bridges s.n. [Cord. de Santiago] (Br, S);

C. Gay s.n. [Chili, Plata, entre S. Jago et Cordova] (P); Germain s.n. [Cord de Santiago] (Cb, K); Grandjot & Grandjot s.n. [XI. 1933] (N); Werdermann 488 (Ca--278847, Gg--129903, K, N, S). Valparaiso: Bridges s.n. [Valparaiso] (K, N). Province undetermined: Bridges 459 (K); Comber 412 [Pucacharole] (K); Cruckshanks 97 [Ojos de Azua] (K, N); Cuming 226 (Br, K); Drummond 226 [Cordilleras] (Bm); C. Elliot 649 (K); Herb. Bentham s.n. [Chili] (G); Herb. Univ. Christianiense s.n. [E. Chili] (Ol). ARGENTINA: Catamarca: Castillón 9363 [Herb. Osten 8457] (Ug); Jürgensen 1403 [Herb. Osten 10678] (G, G, N--photo, Sp--25788, Sp, Ug, Z--photo), s.n. [Herb. Inst. Biol. S. Paulo 20062; Herb. Osten 10678] (N); Schreiter 10508 [Herb. Inst. Miguel Lillo 6795] (N); Venturi 6720 (W--1591496). La Rioja: Hieronymus & Niederlein 614 (K). Mendoza: Barkley 19Ar854 (N), 19Ar855 (N, Ug); Bodenbender 16 [F. Kurtz 10011; Herb. Osten 13028] (Ug); Cáceres & Paci 248 (N); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 36850] (N); Cuezzo & Balegno 1900 (N), 1923 (S); Gillies s.n. [Andes of Chile & Mendoza] (Lu--cotype), s.n. [Villavicencio] (K--cotype, N--photo of cotype, Z--photo of cotype); Moseley s.n. [Sta. Rosa de los Andes to Uspallata Pass] (K); Nicora 4339 (N), 4361 (N); Reales 2024 (Vi); E. C. Reed 175 (K); Ruiz Leal 1023 (N), 1885 (N), 2873 (N), 3632 (N), 4070 (N), 4374 (N), 5441 (N), 6923 (N); Sanzin s.n. [Herb. Osten 12805] (Ug); Semper s.n. [Ruiz Leal 4168] (N), s.n. [Ruiz Leal 6298] (N), s.n. [Ruiz Leal 8211] (N). Río Negro: De Barba 375 (Ca). Tucumán: Pearce s.n. [Aconquija, Dec. 1863] (K).

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A NEW FORM OF SASSAFRAS FROM LONG ISLAND

Fred W. Oswald

SASSAFRAS ALBIDUM f. MOLDENKEI Oswald, f. nov.

Haec forma a forma typica speciei foliis maturitate subtus sericeo-pubescentibus et sarmentis glabris lucide rubro-purpureis juventute glaucis recedit.

This form differs from the typical form of the species in that its leaves are silky-pubescent beneath when fully mature, while the twigs are glabrous, glaucous when young, and bright red-purple.

Sassafras albidum (Nutt.) Nees has leaves which are glabrous, or essentially so, when young, and the twigs green or brown, while S. albidum var. molle (Raf.) Fern. has the leaves silky-pubescent beneath when fully mature and the twigs green or brown and closely pubescent or puberulent.

The new form was collected by myself on September 28, 1960, in the Conservation Area of the Hoyt Farm Scout Camp, Commack, Suffolk County, Long Island, New York, and the type specimen is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

This tree is named in honor of Harold Norman Moldenke (1909--), Director of the Trailside Museum in the Watchung Reservation and Supervisor of Nature Activities for the Union County, N. J., Park Commission, as a token of appreciation for his work in greatly furthering public interest, through all available media, in the wonders and beauties of nature and in their conservation, so vital for the continued preservation of our country's natural resources.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS DIPYRENA

Harold N. Moldenke

This is the twenty-sixth in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated were Aegiphila Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Diostea Miers, Hierobotana Briq., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Stylodon Raf., Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of the genus Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material was examined, in whole

or in part, in the preparation of these works will be found in *Phytologia* 5: 154--159 (1955), 6: 242 (1958), and 7: 91--92 (1959) 123--124 & 293 (1960).

DIPYRENA Hook., Bot. Misc. 1: [355]. 1830.

Synonymy: *Wilsonia* Gill. & Hook. in Hook., Bot. Misc. 1: 172--173, pl. 49. 1829 [not *Wilsonia* R. Br., 1810]. *Wilsonia* Hook. & Arn. ex F. Phil., Cat. Pl. Vasc. Chil. 217, in syn. 1881.

Literature: R. Br., Prodr. Fl. Nov. Holl., ed. 1, 1: 490. 1810; Ann. des Sc. Nat. 18: Rév. Bibl. 70. 1829; Hook., Bot. Misc. 1: 172--173, pl. 49 (1829) and 1: [355]--356. 1830; Endl., Gen. Pl. 1: 634. 1838; Meisn., Pl. Vasc. Gen. 1: 290 and 2: 199. 1839; Schau. in A. DC., Prodr. 11: 535 & 544. 1847; C. Gay, Hist. Fis. Chile Bot. 5: 24--25. 1849; R. A. Phil., Linnaea 29: 21--22. 1857; Bocq., Adansonia 3: 212. 1863; Bocq., Rév. Groupe Verbénac. 116, pl. 18. 1863; R. A. Phil., Anal. Univ. Chil. 35: 193. 1870; Benth. in Benth. & Hook. f., Gen. Pl. 2 (2): 1146. 1876; F. Phil., Cat. Pl. Vasc. Chil. 217. 1881; Jacks., Ind. Kew. 1: 777 (1893), 2: 628 (1894), and 2: 1231. 1895; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 156. 1894; Sanzin, Anal. Soc. Cient. Argent. 88: 105--106, fig. 9. 1919; Stapf, Ind. Lond. 2: 510 (1930), 5: 285 (1931), and 6: 495. 1931; Junell, Symb. Bot. Upsal. 4: 42--43, pl. 1, fig. 3. 1934; Moldenke in Fedde, Repert. 41: 62. 1936; H. S. Marshall, Kew Bull. 1936: 87. 1936; Moldenke, Geogr. Distrib. Avicenn. 1 & 29. 1939; Moldenke in Fedde, Repert. 46: 20. 1939; Moldenke, Prelim. Alph. List Invalid Names 24, 38, & 54. 1940; Moldenke, Lilloa 5: 389--390. 1940; Moldenke, Suppl. List Invalid Names 11. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 92. 1942; Moldenke, Alph. List Invalid Names 23, 39, & 57. 1942; Covas & Schnack, Darwiniana 7: 85 & 89. 1945; Moldenke, Alph. List Cit. 1: 235 (1946) and 2: 358, 408, 441, 598, & 613. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 23, 24, 31, & 43. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 103 & 185. 1949; Moldenke, Alph. List Cit. 3: 730, 772, 809, 812, & 857. 1949; J. H. Hunziker, Revist. Invest. Agric. 6 (2): 192. 1952; Moldenke, Résumé 123, 278, 340, 393, 407, & 454. 1959.

Rigid and erect woody shrubs, branched, often glabrous throughout; leaves small, alternate or scattered, sessile or subsessile, deciduous, often fascicled at the nodes, linear-spatulate, entire, rather thick-textured, acute or obtuse, nigrescent in drying; inflorescence terminal, indeterminate (racemose), spicate or racemiform, rather dense, centripetal; flowers very short-pedicellate, borne in the axils of small linear bractlets, hypogynous, complete, perfect; prophylla very tiny or absent; calyx small, gamosepalous, tubular-campanulate, slightly zygomorphic, rather thick-textured, 5-dentate or shortly 5-fid during anthesis, later more deeply so, the posterior lobe smaller; corolla gamopetalous, zygomorphic, infundibular, its tube elongate, cylindric, often incurved, slightly ampliate above, the limb obliquely spreading, sub-bilabiate, the posterior lip exterior and deeply 2-fid, the anterior lip 3-parted, all the lobes rather

broad, somewhat unequal or the lateral ones somewhat smaller; stamens 4, didynamous, inserted above the middle of the corollatube, slightly exserted; anthers ovate-oblong, not appendaged, with parallel thecae; pistil single, compound; style clavate at the apex; stigma obliquely dilated; ovary 4-celled, each cell 1-ovulate, made up of two 2-celled carpels, surrounded by a glandular disk at the base; fruit drupaceous, subglobose, fleshy, not surpassing the mouth of the fruiting-calyx and not enclosed completely by it, splitting into two 2-celled and 2-seeded, plano-convex and smooth pyrenes; seeds erect, without endosperm; radicle inferior.

This is a very distinct monotypic genus known only from the provinces of Mendoza and San Juan, Argentina. The type species is Wilsonia glaberrima Gill. & Hook. [= Dipyrena glaberrima (Gill. & Hook.) Hook.]. A common name in Spanish proposed for the group by Gay is "dipirena". It is a genus obviously related to Priva Adans. and Castelia Cav., both of which genera, however, differ in being herbaceous, with larger decussate-opposite leaves, and fruit that is completely enclosed by the cucullate mature fruiting-calyx. Bocquillon actually united Dipyrena with Priva.

The original publication of Dipyrena by Hooker is mis-quoted by Schauer in A. DC., Prodr. 11: 535 (1847) where he says "Dipyrena Hook. bot. misc. 1 p. 365. non R. Br. Endl. gen. n. 3689." This is erroneous — the page number should be "355", and there is no genus Dipyrena of Robert Brown. What Schauer obviously intended was to place the phrase "non R. Br." after the "Wilsonia Hook. et Gill. ibid. p. 172, tab. 49" synonym.

The following are excluded species:

Dipyrena dentata R. A. Phil. = Diostea juncea (Gill. & Hook.)

Miers

Dipyrena glaberrima Walp. = Junellia aspera (Gill. & Hook.) Moldenke

Dipyrena valdiviana R. A. Phil. = Diostea juncea (Gill. & Hook.)

Miers

The date "1829" for Wilsonia Gill. & Hook. is apparently correct — see Ann. des Sc. Nat. 18: Rev. Bibl. 70 (1829) — but the index page 355 on which the name Dipyrena was proposed is correctly dated "1830". The Camfield 25022, distributed as this species, is actually Wilsonia backhousii Hook. f. in the Convolvulaceae.

DIPYRENA GLABERRIMA (Gill. & Hook.) Hook., Bot. Misc. 1: [355] & 356. 1830 [not D. glaberrima Walp., 1843].

Synonymy: Wilsonia glaberrima Gill. & Hook. in Hook., Bot. Misc. 1: 173, pl. 49. 1829. Dipyrena wilsonia Hook. ex C. Gay, Hist. Fis. Chile Bot. 5: 25, in syn. 1849. Priva glaberrima (Gill. & Hook.) Bocq., Adansonia 3: 212 [Rév. Groupe Verbénac. 116, pl. 18]. 1863. Dipyrena glaberrima Hook. ex Bocq., Adansonia 3: 212, in syn. 1863. Dipyrena wilsonia Hook. & Arn. ex F. Phil., Cat. Pl.

Vasc. Chil. 217, sphalm. 1881. *Dipyrena wilsonia* F. Phil. apud Jacks., Ind. Kew. 1: 777, in syn. 1893. *Dipyrena gratissima* Gill. & Hook. ex Moldenke, Prelim. Alph. List Invalid Names 24, in syn. 1940. *Dipyrena glaberrima* Gill. & Hook. ex Moldenke, Résumé 278, in syn. 1959. *Verbena glaberrima* Gill. & Hook. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960.

Literature: see under *Dipyrena* as a genus.

Illustrations: Hook., Bot. Misc. 1: pl. 49. 1829; Bocq., Rév. Groupe Verbénac. pl. 18. 1863; Sanzin, Anal. Soc. Cient. Argent. 88: 105--106, fig. 9. 1919; Junell, Symb. Bot. Upsal. 4: pl. 1, fig. 3. 1934.

Low tree or erect woody shrub, to 2.5 m. tall, erect, branched, often glabrous throughout, with the aspect of *Junellia aspera*; branches and branchlets short, slender, gray, very leafy, subspinescent at the apex, glabrate or obscurely pulverulent, puberulent-pilose on the top of the spurs; principal internodes abbreviated, 3--10 mm. long; leaves scattered-alternate on the twigs and young branchlets, borne in fascicles of 4--10 on short and broad spurs 0.5--1.5 mm. long, especially on younger branches, small, deciduous, sessile or subsessile; leaf-blades thick and rather fleshy when fresh, chartaceous and brittle when dried, uniformly dark-green on both surfaces, often brunnescent or nigrescent in drying, narrowly oblanceolate to oblong-spatulate or linear-spatulate, 4--17 mm. long, 1--3 mm. wide, acute or obtuse at the apex, long-attenuate to the very narrow base, entire, glabrous on both surfaces, sometimes slightly revolute along the margins, 1-nerved; midrib and other venation indiscernible or practically so on both surfaces; inflorescence terminal, indeterminate (racemose), spicate or racemiform, usually terminating each twig, centripetal, rather dense; racemes often subspicoid, 2.5--5 cm. long, many-flowered, the flowers alternate or subopposite, hypogynous, complete, perfect, fragrant, loosely congested, borne on very slender pedicels about 1 mm. long in the axils of small linear bractlets; peduncle and rachis continuous with the adjacent twig and similar in all respects but more slender, glabrous, brownish or stramineous; sympodia much abbreviated, usually 1--3 mm. long; lower bracts foliaceous; prophylla very tiny or absent; calyx small, gamosepalous, tubular-campanulate or oblong-cylindric, slightly zygomorphic, rather thick-textured, 5-dentate or shortly 5-fid during anthesis, later more deeply so, the posterior lobe or tooth smaller than the rest; corolla gamopetalous, zygomorphic, infundibular, about 4 times as long as the calyx, varying from pale-yellowish or yellowish-white to cream-yellow, cream, waxy-cream, or white, its tube elongate, cylindric, often incurved, slightly ampliate above, the limb obliquely spreading, sub-bilabiate, the posterior lip exterior and deeply 2-fid, the anterior lip 3-parted, all the lobes rather broad, somewhat unequal or the lateral ones somewhat smaller; stamens 4, didynamous, inserted above the middle of the corolla-tube, slightly exserted; anthers ovate-oblong, not appendaged, with parallel thecae; pistil single, compound; style fil-

form, clavate at the apex; stigma obliquely dilated or lateral; ovary 4-celled, each cell 1-ovulate, made up of two 2-celled carpels, surrounded by a glandular disk at the base; fruiting-calyx open at the apex, not cucullate; fruit green when young and fresh, black when dry, drupaceous, subglobose or oval, fleshy, not surpassing the mouth of the fruiting-calyx and not enclosed completely by it, splitting into two 2-celled and 2-seeded plano-convex and smooth pyrenes; seeds erect, without endosperm; radicle inferior.

The type of this distinct species was collected by John Gillies in the valleys of the Uspallata range of mountains near Mendoza, Argentina, at an altitude of 5000 to 6000 feet, in 1821 or 1822, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. There is a fine pencil sketch of the flowers and fruit on the type sheet. An isotype bears the legend "Near Villaviciencio - Feby. 28. 1821" and another says "Cerro Bayo near Mendoza - Dec. 3, 1822. Frequent in all the valleys along the earlier part of the Cordillera near Mendoza." The species was also collected by Gillies near San Pedro on November 13, 1824, and at Mendoza in 1825. The species is known only from the eastern slope of the Andean Cordillera in the provinces of Mendoza and San Juan, at altitudes of 1200 to 2700 meters. It has been collected in rocky canyons, rocky ground, and quebradas, on mountains, and along highways in granitic soil. It has been collected in anthesis from October to April, and in fruit in February and December. Semper reports it as rare.

The length of the pistil in relation to the size of pollen-grains is discussed by Covas and Schnack in *Darwiniana* 7: 85 & 89 (1945). According to Junell, its ovary structure is exactly the same as that seen in Priva lappulacea (L.) Pers. He also states that he has seen a micropylar haustorium of at least 8 cells in length in one of his cross-sections.

Herbarium material has been misidentified and distributed as Junellia asparagoides (Gill. & Hook.) Moldenke and as "Janellia asparagoides (Gill. ex H. & A.) Moldenke". According to Schauer in A. DC., Prodr. 11: 544 (1847) the Dipyrena glaberrima of Walpers, Act. Acad. Nat. Cur. 19: Suppl. 1: 379 is Junellia aspera (Gill. & Hook.) Moldenke.

The date for the original publication of Wilsonia glaberrima is erroneously given as "1830" by Jackson in the "Index Kewensis" [cfr. Ann. de Sc. Nat. 18: Rév. Bibl. 70 (1829) and H. S. Marshall, Kew Bull. 1936: 87 (1936)], where the original publication of Dipyrena glaberrima is also erroneously given as page "172". Stapf cites the illustration in Hook., Bot. Misc. as "1830".

In all, 47 herbarium specimens, including the types of all the names involved, and 5 mounted photographs have been examined.

Citations: ARGENTINA: Mendoza: F. A. Barkley 19Ar951 (N, Ug); Bodenbender 71 [F. Kurtz 10013; Herb. Osten 13022] (Ug); Burkart, Troncoso, & Nicora 14241 (N); Cáceres & Paci 283 (N, N); Carette s.n. [Ruiz Leal 2562] (N); Gillies 1 (Bm, N—photo), s.n. [in the

valleys of the Uspallata range of mountains toward Mendoza] (Ed--isotype, K--type, K--isotype, Lu--isotype, N--isotype, N--photo of type, Z--photo of type), s.n. [near San Isidro, Nov. 13, 1824] (K), s.n. [Mendoza, 1825] (G, K), s.n. [Baths of Villa Vicencio] (G); Herb. Ledebour s.n. [Mendoza] (L); Jürgensen 185 (Cp, Cp); D. O. King 141 (Bm); Mexia 4390 (Ca--560639, G, N--photo, Z--photo); Nicora 4347 (N); Perez Moreau s.n. [Herb. Mus. Argent. Cienc. Nat. 12705] (N); R. A. Philippi s.n. [Andes Mendocinae] (B, B, B, Cb, N, P, V), s.n. [Cordillera de Mendoza] (V); Rimbach 18 (L); Ruiz Leal 1044 (N), 4372 (N), 4794 (N); Sanzin 226 [Herb. Osten 12822] (Ug); Semper 245 (S), s.n. [Ruiz Leal 4135] (N), s.n. [Ruiz Leal 4224] (N), s.n. [Ruiz Leal 10220] (N); Sparre 1496 (S); Spegazzini 11878 (Ca--882457); E. Wall 5, in part (Ew, Ew). San Juan: Saile Echegaray s.n. [Leoncito, I. 1876] (B).

MATERIALS TOWARD A MONOGRAPH OF THE GENUS ACANTHOLIPPIA

Harold N. Moldenke

This is the twenty-seventh in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated were Aegiphila Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Diostea Miers, Dipyrena Hook., Hierobotana Briq., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Stylodon Raf., Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material was examined, in whole or in part, in the preparation of these works will be found in Phytologia 5: 154--159 (1955), 6: 242 (1958), and 7: 91--92 (1959), 123--124 & 293 (1960).

ACANTHOLIPPIA Griseb., Abh. K. Gesell. Wiss. Götting. 19: 244 [Pl. Lorentz. 196]. 1874.

Literature: C. Gay, Hist. Fis. Chile Bot. 5: 29--30. 1849; R. A. Phil., Fl. Atac. 40. 1860; A. Gray, Proc. Am. Acad. 6: 49--50. 1862; R. A. Phil., Anal. Univ. Chile 27: 350. 1865; R. A. Phil., Anal. Univ. Chile 36: 192--193 [Sert. Mendoc. Alt. 34]. 1870; Griseb., Abh. K. Gesell. Wiss. Götting. 19: 244--245 [Pl. Lorentz. 196--197]. 1874; Benth. in Benth. & Hook., Gen. Pl. 2: 1143. 1876; Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb.

Fl. Argent.] 279. 1879; Hieron., Bol. Acad. Nat. Córdoba 4: 407. 1881; Ball, Journ. Linn. Soc. Lond. Bot. 21: 230. 1884; Lorentz & Niederlein, Exped. Rio Negro 266. 1889; Jacks., Ind. Kew. 1: 18 (1893), 2: 96--96 (1894), and 2: 1178. 1895; R. A. Phil., Anal. Univ. Chile 90: 620 & 622. 1896; Briq., Ann. Conserv. & Jard. Bot. Génév. 4: 21. 1900; Dusén, Patagonien 252. 1900; R. E. Fries, Nov. Act. Reg. Soc. Sci. Upsal., ser. 4, 1: 110. 1905; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patagonia 8 (2): 691-692. 1905; Hauman-Merck, Anal. Mus. Nac. Nat. Hist. Buenos Aires 24: 415. 1913; Sanzin, Anal. Soc. Cient. Argent. 88: 101. 1919; Molfino, Physis 5: 21. 1921; Doming., Mat. Med. 117. 1928; I. M. Johnston, Physis 9: 317. 1929; Welmer, Die Pflanzenstoffe 1022. 1931; Houard, Zoocéd. Pl. Amer. Sud 349--350. 1933; Latzina, Trab. Inst. Bot. & Farm. Buenos Aires 54: 112. 1935; Latzina, Lilloa 1: 189. 1937; Moldenke, Lilloa 5: 370--372. 1940; Moldenke, Prelim. Alph. List Invalid Names 30 & 48. 1940; Moldenke, Suppl. List Invalid Names 1, 5, 6, & 10--12. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 42, & 84. 1942; Moldenke, Alph. List Invalid Names 1, 30--32, & 50. 1942; Moldenke, Lilloa 8: 411--412. 1942; Moldenke, Phytologia 2: 90. 1944; Moldenke, Lilloa 10: 336--337 & 365--366. 1944; Covas & Schnack, Darwiniana 7: 86. 1945; Moldenke, Alph. List Cit. 1: 73, 77, 82, 84, 87, 93, 95, 96, 163, 200, 202, 230, & 233. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 14 & 15. 1947; Cabrera, Anal. Acad. Nac. Cienc. Nat. Buenos Aires 12: 21--22 & 38, fig. 3. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 30, 43, & 44. 1948; Moldenke, Alph. List Cit. 2: 377--379, 381, 384, 440, 442, 443, 537, 575, 599, 620, & 626--629 (1948), 3: 672, 673, 693, 733, 735, 748, 749, 775, 804, 813, 880, 896, 910, & 916 (1949), and 4: 1017, 1032, 1090--1092, 1095, 1116, 1178, 1191, 1203, 1214, 1249, 1251, 1293 & 1302. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 95, 100, 102, & 174. 1949; Moldenke, Phytologia 3: 106--107. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. [Santiago, Chile] 25: 38. 1951; J. H. Hunziker, Revist. Invest. Agric. 6 (2): 192. 1952; Biol. Abstr. 28: 904. 1954; Moldenke, Résumé 112, 120, 122, 227, 233, 312--314, 316, 317, 373, 406, & 440. 1959.

Intricately much-branched xerophilous shrubs, usually small and depressed or even prostrate, often aromatic; stems and branches tough, white or yellow, often longitudinally many-ridged, glabrous or puberulent, often covered with corky bark; twigs numerous, short, stiff, divaricate, often spine-tipped, densely puberulent or glabrescent; principal internodes much abbreviated, the twigs often only 5--15 mm. apart, but the leaves borne more or less irregularly on the branches between the twigs, the leaves on the twigs mostly adjacent or practically so; leaves mostly opposite, but often alternate or scattered, minute, often much reduced and scale-like, fleshy, sessile and closely adnate to the twigs, branchlets, branches, and even scattered on the main stems, or bearing fascicles of additional leaves in their axils, 1--6 mm. long, mostly 3-lobed or 3-parted,

the central lobe usually longer than the lateral ones, with much thickened and more or less revolute margins, often deeply 2- or 3-canaliculate beneath, glabrous or pilose-puberulent, sometimes ciliolate, no expanded non-appressed leaves produced even during and after anthesis, the lobes or lobules acute or obtuse, short; inflorescence terminal or both axillary and terminal, often much abbreviated and capitate, dense and congested when young, mostly less than 1 cm. long and wide, few-flowered, sometimes finally becoming cylindric and then to 1.6 cm. long; bractlets rather large, imbricate, broadly elliptic or ovate-deltoid, the lowest often merging into the uppermost leaves, often somewhat navicular, sometimes short-acuminate at the apex and carinate on the back, densely white-villous on the back, varying from longer than to equaling or shorter than the calyx; rachis densely villosulous; calyx membranous, gamosepalous, inferior, tubular, 2--4 mm. long, not winged, densely pilose, villous, or white-hispid, its rim 4-crenate or 4-dentate, the teeth mostly short, distinct, and acute, with broad membranous sinuses; corolla gamopetalous, infundibular, mostly white, with a yellow throat, its tube equaling or slightly surpassing the calyx, narrow-cylindric, the limb spreading, 2-lipped, unequally or subequally 4- or 5-lobed, usually about 1/3 as long as the tube, the lobes subrotund; stamens didynamous, included or short-exserted, the upper (posterior) ones often terminating in a small capitate appendage which is a prolongation of the connective; anthers 2-celled; ovary 2-celled, the cells 1-ovulate; ovules erect; style single, terminal, filiform; stigmas capitate; fruit 2-coccous, dry, the nutlets concavo-plane on the ventral surface, easily separating, rounded on the dorsal surface; seeds with copious endosperm; embryo axile; endosperm fleshy; radicle inferior.

The genus is closely related to Lippia Houst., but differs in its singular xerophilous habit and its copious endosperm. Grisebach notes that endosperm is known in the Verbenaceae only in this genus and in Neosparton Griseb. Five species are known in the genus, all native to desert and semi-desert areas in Chile, Argentina, and Bolivia. The type species of the genus is A. hastulata Griseb.

In all, 171 herbarium specimens and 15 mounted photographs have been examined. An artificial key to the species follows:

1. Leaves with several pairs of lobules at the base. A. hastulata.
- 1a. Leaves with only a single pair of lobules at the base.
2. Leaves much reduced and scale-like, all closely adnate to the branches.....A. riojana.
- 2a. Leaves larger, at least the mature ones spreading.
3. Leaves ovate in outline, truncate at base. A. deserticola.
- 3a. Leaves obovate or elliptic in outline, cuneate at base.
4. Leaves usually plainly obovate, the lobes very short, the sinuses extending to about one-third the length of the blade; Argentina.....A. seriphioides.
- 4a. Leaves usually elliptic in outline, the lobes elongated

and the sinuses extending to the middle or occasionally to the base of the blade; Chile.....A. trifida.

ACANTHOLIPPIA DESERTICOLA (R. A. Phil.) Moldenke, Lilloa 5: 370. 1940.

Synonymy: Verbena (Shuttleworthia) deserticola R. A. Phil, Fl. Atac. 40. 1860. Lippia deserticola R. A. Phil., Anal. Univ. Chile 27: 350. 1865. Lippia microphylla R. A. Phil., Anal. Univ. Chile 27: 350. 1865 [not L. microphylla Benth., 1894, nor Cham., 1832]. Acantholippia salsoloides Griseb., Abh. K. Gesell. Wiss. Götting. 19: 244--245 [Pl. Lorentz. 196--197]. 1874. Lippia trifida R. A. Phil., Fl. Atac. 40. 1860 [not L. trifida C. Gay, 1849, nor Clos, 1896, nor Remy, 1940]. Lippia salsoloides Benth. in Benth. & Hook. f., Gen. Pl. 2: 1143. 1876. Lippia salsoloides Benth. & Hook. f. ex Jacks., Ind. Kew. 2: 95. 1894. Lippia salsoloides Briq. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Lippia salsoloides (Griseb.) Benth. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Lippia salsoloides (Griseb.) Benth. & Hook. ex Moldenke, Lilloa 10: 365, in syn. 1944. Lippia salsoloides (Griseb.) Briq. ex Moldenke, Résumé 316, in syn. 1959.

Literature: R. A. Phil., Anal. Univ. Chile 27: 350. 1865; Griseb., Abh. K. Gesell. Wiss. Götting. 19: 244--245 [Pl. Lorentz. 196--197]. 1874; Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 279. 1879; Jacks., Ind. Kew. 1: 18 (1893) and 2: 95. 1894; R. A. Phil., Anal. Univ. Chile 90: 622. 1896; I. M. Johnston, Physis 9: 317. 1929; Moldenke, Lilloa 5: 370. 1940; Moldenke, Suppl. List Invalid Names 1, 5, & 6. 1941; Moldenke, Alph. List Invalid Names 1 & 30--32. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 42, & 84. 1942; Moldenke, Lilloa 8: 411--412 (1942) and 10: 336--337 & 365. 1944; Moldenke, Phytologia 2: 90. 1944; Moldenke, Alph. List Cit. 1: 95 & 233. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Alph. List Cit. 2: 377, 378, 440, 442, 537, 599, & 628 (1948), 3: 672, 733, 735, 804, 813, & 916 (1949), and 4: 1032, 1092, 1116, 1191, 1203, 1293, & 1302. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 95, 100, 102, & 174. 1949; J. H. Hunziker, Revist. Invest. Agric. 6 (2): 192. 1952; Moldenke, Résumé 112, 120, 122, 227, 312, 314, 316, 317, & 440. 1959.

An intricately branched shrub, to 1 m. tall, very fragrant; branches short, thick, pulverulent-tomentose, often spinescent, the pubescence whitish; leaves very small, about 2 mm. long, rather thick-textured, canescent, trifid, the segments ovate, sulcate-canaliculate beneath, the central one longest; spikes rather short; calyx elongate, hispid-lanate with long hairs, the teeth subspinescent, the hairs rather long; corolla white or pale-blue.

Hueck says that this is a characteristic plant of the shrubby steppe. It is said by Philippi to be frequent in the northwestern part of the Atacama Desert. I found it myself as a common very spiny shrub 1 to 3 feet tall on the puna at San Antonio de

los Cobres, at an altitude of 15,662 feet, on October 21, 1948. It has been collected also on dry campos, at altitudes of 3300 to 4500 meters, in flower from January to April and September to November. A popular vernacular name for it is "rica-rica". It is said by Hunziker to be medicinal.

The species is very similar to and closely related to A. trifida (C. Gay) Moldenke. Both are very fragrant and pulverulent-tomentose, with trifid leaves and hispid-lanate calyxes. However, in A. trifida the branches are much longer and thinner, the hairs are yellowish, the leaves are 5 mm. long, the calyx-hairs are mostly short, and the calyx-teeth are not spinescent, while in A. deserticola the branches are short and thick, the hairs are whitish, the leaves are only 2 mm. long, the calyx-hairs are much longer, and the calyx-teeth are subspinescent.

The type collection of A. salsoloides is Lorentz 457 from Laguna Blanca, at an altitude of 10,000 feet. Specimens of the species have been misidentified and distributed in herbaria as A. hastulata Griseb., Lippia sp., and L. hastulata (Griseb.) Hieron.

In several of my previous publications I regarded the binomials, Lippia riojana Hieron. and L. riorjana Hieron., as synonyms of A. deserticola, and cited Hieronymus & Niederlein 547 and s.n. [Vinchina, 5.III.1879], and T. Meyer 4045, all from La Rioja, Argentina. These names and collections are, however, now regarded by me as representing a distinct species, A. riojana Hieron. & Moldenke.

In all, 36 herbarium specimens and 4 photographs, including the type collections or phototypes of all the names involved, have been examined.

Citations: BOLIVIA: Potosí: Asplund 3037 (S, Us), 3168 (S, Us). Province undetermined: Kuntze s.n. [Condri] (N). CHILE: Antofagasta: Pfister 9366 (S); V. Schwartz s.n. [pr. Ascoku o Cebollar, Dec. 1916] (Go); Werdermann 1024 (Ca—314693, Gg—147434, N, S). Atacama: R. A. Philippi s.n. [Macbride photos 17501] (Kr—photo of isotype, N—photo of isotype). ARGENTINA: Catamarca: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 30/601] (N); Jørgensen 1736 [Herb. Inst. Miguel Lillo 32373; Herb. Osten 11010; Herb. Mus. Argent. Cienc. Nat. 23980] (N, N, N, Ug); Lorentz 457 [Macbride photos 17540] (Kr—photo, N—photo); Peirano s.n. [Herb. Inst. Miguel Lillo 32832] (N). Jujuy: Claren 11577 (S); R. E. Fries 746 [10.11.1901] (S), 746 [18.11.1901] (N, S); Scolnik 147 (W—2045557); Venturi 10129 (N, S). Salta: Budin s.n. [Herb. Mus. Argent. Cienc. Nat. 30/1037] (N); Gerling s.n. [XII.1897] (N); Hueck 276 (N); Krapovickas 3126 (N); T. Meyer 3445 [Herb. Inst. Miguel Lillo 35568] (En, N); Moldenke & Moldenke 19745 (Es, Lg, N, N, Sm).

ACANTHOLIPPIA HASTULATA Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 279. 1879.

Synonymy: Lippia hastulata (Griseb.) Hieron., Bol. Acad. Nat. Córdoba 4: 407. 1881. Lippia hastatula Hieron. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Lippia hastatula (Griseb.) Hieron. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Acantholippia hastatula Griseb. ex Moldenke, Lilloa 10: 365, in syn. 1944. Lippia hastulata Griseb. ex Moldenke, Résumé 313, in syn. 1959.

Literature: Griseb., Abh. K. Gesell. Wiss. Götting. 19: 244 (1874) and 24: [Symb. Fl. Argent.] 279. 1879; Hieron., Bol. Acad. Nat. Córdoba 4: 407. 1881; R. E. Fries, Nov. Act. Reg. Soc. Sci. Upsal., ser. 4, 1: 110. 1905; Doming., Mat. Med. 117. 1928; Wehmer, Die Pflanzenstoffe 1022. 1931; Latzina, Trab. Inst. Bot. & Farm. Buenos Aires 54: 112. 1935; Latzina, Lilloa 1: 189. 1937; Moldenke, Lilloa 5: 370. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Lilloa 8: 412. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 84. 1942; Moldenke, Phytologia 2: 90. 1944; Moldenke, Lilloa 10: 337 & 365--366. 1944; Moldenke, Alph. List Cit. 1: 77 & 95. 1946; Cabrera, Anal. Acad. Nat. Cienc. Buenos Aires 12: 21--22, fig. 3, & 38. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 377, 379, 381, 384, 442, 575, & 620 (1948), 3: 673 & 910 (1949), and 4: 1090--1092. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 95, 102, & 174. 1949; Moldenke, Résumé 112, 122, 227, 313, & 440. 1959.

Illustrations: Cabrera, Anal. Acad. Nat. Cienc. Buenos Aires 12: 21, fig. 3. 1947.

Shrub, to 2.5 m. tall, aromatic; branches approximate, slender, spreading, rigid, densely leafy, 8--12.5 cm. long, eventually leafless, spinescent at the apex; branchlets villosulous; leaves alternate, sessile, rather thick, about 4 mm. long, deltoid-acute, lobulate at the base, broad, subglabrous, ciliolate, incrassate and revolute along the margins, the basal lobules contiguously 2- or 3-paired, subrotund, the leaf-blades entire beyond the lobules, canaliculate between the margins and the thickened midrib; midrib prominent beneath, connected to the margins below the apex; inflorescence capitate, the heads terminal on the branchlets, at first ovoid and 6--8 mm. long, finally becoming cylindric and 12--16 mm. long; bractlets deltoid, the lowest ones merging into the upper leaves, equaling the calyx; calyx about 4 mm. long, white-pilose, 4-dentate, the teeth short, distinct, acute, with broad membranous sinuses; corolla white, its tube equaling the calyx, the limb 2-lipped, about 1/3 as long as the tube, the lobes 5, subequal, subrotund; embryo axile; endosperm copious.

The type of this species, which is also the type of the genus, was collected by Paul Günther Lorentz and Georg Hans Emno Wolfgang Hieronymus (no. 713) at San José de Tilcara, Maimara, Jujuy, Argentina. The binomial is erroneously cited to Abh. K. Gesell. Wiss. Götting. 19: 244 (1874) by me in Lilloa 5: 370 (1940). The species inhabits mountain slopes, hillsides, quebradas, and arid dry washes, at altitudes of 2800 to 3600 meters, and has been

collected in anthesis from December to March. A popular name for it is "rica-rica". Hunziker says that it is a "common shrub very abundant on the banks of the Río Grande, used very extensively as a medicinal plant, an infusion being made for stomach-ache." Castellón calls it "medicinal", Hauman reports its being used in the form of an infusion as a stomachic, and Schulz also records it as a stomachic. West reports that it is used as a flavoring in maté. Wehmer, in the reference cited above, says that it contains an ethereal oil resembling some types of menthol, containing terpenen $C_{10}H_{14}$, phenolen, fat, wax, rosin, sugar, and organic acids in strength. He reports that it has properties resembling phytosterin and glykoside, consisting of 4.3 percent water, 13.75 percent ash, and 60 percent SiO_2 and other acids.

The T. Meyer 3445 cited by me in Lilloa 8: 412 (1942), as well as the Jürgensen 1736 and Budin s.n. cited in Lilloa 5: 370 (1940), as this species, actually all have proved to be A. deserticola (R. A. Phil.) Moldenke instead. Grisebach says it is similar to A. deserticola, but is "destitute of elongate wool" and differing in the calyx-teeth and corolla.

In all, 16 herbarium specimens and 2 mounted photographs, including the type collections or phototypes of all the names involved, have been examined.

Citations: BOLIVIA: Potosí: Fiebrig 3200 [Herb. Osten 15225] (N, Ug). ARGENTINA: Jujuy: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 23900] (N); Castillón 6607 [Herb. Inst. Miguel Lillo 32370] (Ca--8628); Hauman s.n. [La Quiaca, II.1916] (Br); Hunziker 1334 (N); Lorentz & Hieronymus 713 [Macbride photos 17511] (Kr--photo of type, N--isotype, N--photo of type); Schreiter 11126 [Herb. Inst. Miguel Lillo 34420] (N); A. G. Schulz 8762 (Sz); Venturi 4885 (Ca--376048, Gg--157719), 8114 (Ca--397728), 8300 (Ca--397687, Gg--173478), s.n. [Humahuaca, Feb. 28, 1929; Herb. Inst. Miguel Lillo 37999] (N); J. West 6301 (Ca--578733).

ACANTHOLIPPIA RIOJANA Hieron. & Moldenke ex Moldenke, Phytologia 3: 106--107. 1949.

Synonymy: Acantholippia riojana Hieron. ex Moldenke, Suppl. List Invalid Names 1, in syn. 1941. Lippia riojana Hieron. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Lippia riorjana Hieron. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941.

Literature: Moldenke, Lilloa 5: 370. 1940; Moldenke, Suppl. List Invalid Names 1 & 6. 1941; Moldenke, Alph. List Invalid Names 1 & 32. 1942; Moldenke, Lilloa 8: 411--412 (1942) and 10: 365. 1944; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 102 & 174. 1949; Moldenke, Phytologia 3: 106--107. 1949; Moldenke, Résumé 122, 227, 316, & 440. 1959.

Much-branched xerophilous shrub; stems and branches tough, white, longitudinally many-ridged, glabrous or glabrescent, covered with corky bark; twigs numerous, short, stiff, divaricate,

spine-tipped, densely puberulent; principal internodes much abbreviated, the twigs usually 5—15 mm. apart, but the leaves borne more or less irregularly on the branches between the twigs, the leaves on the twigs mostly adjacent or practically so; leaves mostly opposite, but sometimes alternate or scattered, much reduced and scale-like, fleshy, sessile and closely adnate to the twigs, branchlets, branches, and even scattered on the main stems, 1—2 mm. long, mostly 3-lobed, the central lobe about twice as long as the two lateral lobes, with much thickened and more or less revolute margins, deeply 3-canaliculate beneath, the margins glabrous, but the thin line of leaf-blade visible within the channels mostly minutely puberulent, no expanded non-appressed leaves produced even during and after anthesis; spikes terminal, much abbreviated, dense and congested, less than 1 cm. long and wide, few-flowered; bractlets rather large, imbricate, broadly elliptic, 3—3.5 mm. long, 1.5—2 mm. wide, somewhat navicular, short-acuminate at the apex, carinate on the back, densely white-villous on the back, subequalling the calyx; calyx tubular, about 3.5 mm. long, not winged, densely villous; rachis densely villosulous.

The type of this very remarkable and distinct species was collected by Georg Hans Emmo Wolfgang Hieronymus and Gustavo Niederlein at Vinchina, La Rioja, Argentina, on March 5, 1879, and is deposited in the herbarium of the Botanisches Museum at Berlin. The type collection, as well as Hieronymus & Niederlein 547 and T. Meyer 4045, were erroneously cited by me in Lilloa 8: 412 (1942) and 10: 365 (1944) as A. deserticola (R. A. Phil.) Moldenke. Hieronymus & Niederlein 547 is at least a topotype collection of A. riojana, as is also the February 19, 1879, unnumbered collection.

The species has been found at an altitude of 1350 meters, blooming in January and February, and a popular name is "ricarica" (a name apparently generic in application). Meyer reports that the species is medicinal, being employed locally as a stomachic and to induce abortion. Some herbarium specimens have been misidentified and distributed as A. hastulata Griseb.

In all, 8 herbarium specimens and 2 mounted photographs, including the types or phototypes of all the names involved, have been examined.

Citations: ARGENTINA: La Rioja: Hieronymus & Niederlein 547 (N, Vt, W, W—617536), s.n. [Vinchina, 19.II.1879; Herb. Osten 13003] (Ug), s.n. [Vinchina, 5.III.1879; Macbride photos 17536] (Br—isotype, Kr—photo of type, N—photo of type); T. Meyer 4045 (N, N).

ACANTHOLIPPIA SERIPHIOIDES (A. Gray) Moldenke, Lilloa 5: 370—371. 1940.

Synonymy: Lippia seriphoides A. Gray, Proc. Am. Acad. 6: 49—50. 1862. Verbena rubiginosa Hook. ex A. Gray, Proc. Am. Acad. 6: 50, in syn. 1862. Lippia foliolosa R. A. Phil., Anal. Univ.

Chile 36 [—37]: 192—193 [Sert. Mendoc. Alt. 34]. 1870. Verbena rubiginosa Gill. ex Ball, Journ. Linn. Soc. Lond. Bot. 21: 230, in syn. 1884. Lippia foliolosa Phil. ex Moldenke, Résumé 312, in syn. 1959. Lippia rubiginosa Gill. ex Moldenke, Résumé 316, in syn. 1959 [not L. rubiginosa Schau., 1847].

Literature: A. Gray, Proc. Am. Acad. 6: 49—50. 1862; R. A. Phil., Anal. Univ. Chile 36: 192—193 [Sert. Mendoc. Alt. 34]. 1870; Ball, Journ. Linn. Soc. Lond. Bot. 21: 230. 1884; Lorentz & Niederlein, Exped. Río Negro 266. 1889; Dusén, Patagonien 252. 1900; Briq., Ann. Conserv. & Jard. Bot. Genève. 4: 21. 1900; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patagonia 8 (2): 691—692. 1905; Hauman-Merck, Anal. Mus. Nac. Nat. Hist. Buenos Aires 24: 415. 1913; Sanzin, Anal. Soc. Cient. Argent. 88: 101. 1919; Houard, Zocéd. Pl. Amer. Sud 349—350. 1933; Moldenke, Prelim. Alph. List Invalid Names 30 & 48. 1940; Moldenke, Lilloa 5: 370—372. 1940; Moldenke, Suppl. List Invalid Names 6 & 10—12. 1941; Moldenke, Alph. List Invalid Names 30, 32, & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 84. 1942; Moldenke, Lilloa 8: 412 (1942) and 10: 337 & 366. 1944; Moldenke, Phytologia 2: 90. 1944; Covas & Schnack, Darwiniana 7: 86. 1945; Moldenke, Alph. List Cit. 1: 73, 82, 84, 87, 93, 95, 96, & 200. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Alph. List Cit. 2: 440, 442, 443, 575, 626, & 627 (1948), 3: 748, 749, 813, & 896 (1949), and 4: 1017, 1095, & 1214. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 102 & 174. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Résumé 122, 227, 312, 316, 317, 373, & 440. 1959.

Small and low, depressed or prostrate, woody shrub or bush, to 2 m. tall but usually only 20—30 cm. tall and forming twisted woody clumps, very aromatic with the odor of "cedrón", much-branched, subglabrescent throughout; stems sometimes creeping; branches yellow, 1—2 mm. in diameter; principal internodes 9—10 mm. long; leaves minute, crowded, obovate, about 6 mm. long and 3 mm. wide, 3-lobed, long-cuneate to the base, revolute along the margins, short-pilose over the whole surface beneath, bearing fascicles of additional leaves in their axils, those in the axillary fascicles somewhat smaller, the lobes short and obtuse; spikes axillary along the branches and terminal, short, subglobose, 4—6 mm. long; peduncles leafless, about 6 mm. long; bractlets ovate, green, 1-nerved, rough, the lower ones longer than the calyx, the upper ones much shorter; flowers fragrant, with the aromatic odor of thyme (Thymus serpyllum L.); calyx about 2 mm. long, white-hispid; corolla white, with a yellow throat, its tube slightly longer than the calyx.

The type of this rather common species was collected by Charles Wilkes on the United States Exploring Expedition along the Río Negro, Patagonia, Argentina, and is probably deposited in the Gray Herbarium at Harvard University. The type of Lippia foliolosa was collected by Rudolf Amandus Philippi (no. 178) at or near Mendoza, Argentina. The binomial is cited to "Chili" in error by the "Index Kewensis".

The species inhabits sand dunes, dry sandy areas, dry rocky hills, mountainsides, flat uplands, dry barrancas, pampas, dry campos, arroyos, dry sandy scrub or thornbush country, and the borders of country highways in such areas, growing from near sea-level to an altitude of 2600 meters. Hunziker describes it as abundant in the mountains in Hucal department of La Pampa. Eyerdam, Beetle, & Grondona say that it is scattered rather sparingly over a large area in Río Negro associated with two species of thorny composites along roadsides in sand and gravel in the full sunlight. In Santa Cruz they found it abundant in the disturbed light gravel of hillsides on west exposures, while in Chubut it occurs in sandy soil along roadsides. Rufz Leal says that it is very numerous in Mendoza, where it is used in popular medicine.

It has been collected in anthesis from September to April. Vernacular names recorded for it are "orégano", "tomillo", and "tomillo macho". Hunziker reports that it is employed in the seasoning of foods. Houard, in the reference cited above, states that this species is often infested with galls caused by the insect, Misopatha lippiae Kieff. & Jørgensen. Covas & Schnack (1945) discuss the length of the pistil in relation to the size of pollen-grains. Briquet cites a Donat 43 from San Rafael, but this collection has not as yet been seen by me. The W. Fischer 12, A. Rufz s.n., and Donat 52 collections, cited below, have been previously regarded by me as A. trifida (C. Gay) Moldenke. Herbarium specimens of A. seriphioides have been abundantly misidentified and distributed as Lippia trifida Gay, L. trifida Remy, L. hispida Gay, and Lippia sp.

A. seriphioides is, indeed, closely related to A. trifida, but its cuneiform leaves with obtuse lobes distinguish it without difficulty. In all, 110 herbarium specimens and 3 mounted photographs, including the type collections or phototypes of all the names involved, have been examined.

Citations: ARGENTINA: Buenos Aires: Cabrera 6650 (N); Parodi 13846 (N). Chubut: Cabrera 31 (N, N); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 6183] (N); Eyerdam, Beetle, & Grondona 23809 (Ca-623923); Koslowsky 12356 [Herb. Osten 19356] (Ug); O'Donell 3239 (S), 3391 (N, S), s.n. [Astra, Nov. 10, 1945] (N); Rufz Leal 14688 (Ss). La Pampa: H. H. Bartlett 19936 (Ca-775125, N); Cabrera 4383 (N); Hunziker 4170 (N); O'Donell 1775 (N). Mendoza: F. A. Barkley 19Ar807 (N), 19Ar886 (N); Barkley & Paci 229 (N); H. H. Bartlett 19193 (Ca-772213), 19430 (Ca-772462, N); Cáceres, Melis, & Paci 318 (N); Campos Porto s.n. [Herb. Jard. Bot. Río de Jan. 34478] (N); Carette s.n. [Mendoza, 1916; Herb. Mus. Argent. Cienc. Nat. 23923] (N, N, N); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 36867] (N); Covas 15068 (N); E. M. Garcia 350 (N), s. n. [Estancia Canota, March 20, 1947] (N); Kurtz 7049 (Ja-1924, N); O'Donell 1051 (N); Osten 5128 (Ug); R. A. Philippi 178 [Herb. Mus. Nac. Chile 42416; Macbride photos 17507] (Kr-photo, N--

photo, N--photo); A. Ruiz s.n. [Herb. Mus. Argent. Cienc. Nat. 25/2212] (N); Ruiz Leal 1168 (N), 2193 (N), 2302 (N), 2899 (N), 3329 (N), 3519 (N), 3645 (N), 5022 (N), 6390 (N), 6886 (N), 6959 (N), 7681 (N), 7681/30 [Goodspeed 31030] (Bm), 7693 (N), 7693/42 [Goodspeed 31042] (Bm), 7742 (N), 7742/91 [Goodspeed 31091] (Bm), 8166 (N), 8724 (N), 8984 (N), 9630 (N), 10013 (N); Ruiz Leal & Paci 467 (N); Sanzin 628 [Herb. Osten 12804] (Ug), 963 [Herb. Osten 12803] (Ug), s.n. [Potrerillos, 15. XI.1913] (Dv--9115); A. G. Schulz 6236 (Cb); Semper 617 (N, S), s.n. [Ruiz Leal 4128] (N), s.n. [Ruiz Leal 8179] (N), s.n. [Ruiz Leal 9846] (N), s.n. [Ruiz Leal 10281] (N); Senn 4352 (N). Río Negro: Eyerdam, Beetle, & Grondona 23527 (Ca--627540); W. Fischer 12 (Cm, Io, It, N, Ur); O'Donell 1933 (S); Scala 60 (Ug), 96 (N, N, N); Scolnik 361 (Er, N); Wilkes, U. S. Explor. Exped. s.n. [Río Negro] (N--isotype, T--isotype). San Juan: Castellanos 15197 (W--2198239). San Luis: Bruch & Carette s.n. [Alto Penco, II.1914] (N, N); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 25/2936] (N); Pastore 2074 (Ug--8103); A. G. Schulz 6065 (Z); Vignati 284 (N). Santa Cruz: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 6185] (N); Donat 52 (Ca--413292, Gg--179046, Go, N, S); Dusén 5432 (S), s.n. [Puerto Angosto, 10.12.1904] (Go); Eyerdam, Beetle, & Grondona 24023 (Ca--623699); Ferruglio s.n. [Herb. Mus. Argent. Cienc. Nat. 30/1891] (N); O'Donell 3720 (N, S), 3747 (S), 3945 (N). Province undetermined: Kuntze s.n. [W. Pampas, I.92] (N), s.n. [W. Pampas, I. 94] (N); Moreno & Tonini 180 [Patagonia] (N).

ACANTHOLIPPIA TRIFIDA (C. Gay) Moldenke, Lilloa 5: 371--372. 1940.

Synonymy: Lippia trifida C. Gay, Hist. Fis. Chile Bot. 5: 29--30. 1849. Lippia gracilis R. A. Phil., Anal. Univ. Chile 90: 620. 1896. Lippia trifida Clos ex R. A. Phil., Anal. Univ. Chile 90: 622, in syn. 1896. Lippia trifida Remy ex Sanzin, Anal. Soc. Cient. Argent. 88: 101. 1919. Aloysia gracilis (R. A. Phil.) Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. [Santiago, Chile] 25: 38. 1951.

Literature: C. Gay, Hist. Fis. Chile Bot. 5: 29--30. 1849; Phil., Fl. Atac. 40. 1860; Jacks., Ind. Kew. 2: 96. 1894; R. A. Phil., Anal. Univ. Chile 90: 620. 1896; Hauman, Río Negro 415. 1913; Sanzin, Anal. Soc. Cient. Argent. 88: 101. 1919; Molfino, Physis 9: 21. 1921; Moldenke, Lilloa 5: 371--372. 1940; Moldenke, Suppl. List Invalid Names 5 & 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 42, & 84. 1942; Moldenke, Lilloa 8: 412. 1942; Moldenke, Alph. List Invalid Names 30 & 32. 1942; Moldenke, Lilloa 10: 337. 1944; Moldenke, Alph. List Cit. 1: 163, 202, & 230. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Alph. List Cit. 2: 440 & 629 (1948), 3: 693, 775, & 880 (1949), and 4: 1178, 1249, & 1251. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100 & 174. 1949; Acevedo de

Vargas, Bol. Mus. Nac. Hist. Nat. [Santiago, Chile] 25: 38. 1951; Biol. Abstr. 28: 904. 1954; Moldenke, Résumé 120, 233, 312, 313, 317, & 440. 1959.

Subshrub, to 31 cm. tall, intricately branched, yellowish, strongly and agreeably odorous, puberulent-tomentose or pulverulent to glabrous; branches short, slender, twisted, eventually leafless, the lower ones about 1.5 mm. in diameter, divided into very many stiff branchlets which are very slender, short, and subtetragonal or subcylindric; leaves opposite, deciduous, crowded, minute, sessile, trifid or 3-parted (occasionally entire), to 6 mm. long, smaller (2--4 mm. long) toward the tips of the twigs, numerous on the young shoots, but very soon caducous, about 2 mm. wide, the lobes narrow-linear, obtuse, the central one longest, the sinuses usually extending to the middle of the leaf or occasionally to the base; spikes short, 8--24 mm. long, terminal on the branches, slender, 4- or 5-flowered; flowers minute, sessile in the axils of linear-acute bractlets; calyx campanulate, about 2 mm. long, densely white-pilose or hispid-lanate, the rim 4-toothed, the teeth linear-acute; corolla slightly exserted from the calyx, about 3.5 mm. long, reddish, its limb 4-parted, the lobes rounded; stamens didynamous, the upper ones terminating in a small capitate appendage which is a prolongation of the connective; anthers exserted; fruiting-calyx persistent, including the fruit; fruit composed of 2 nutlets.

The type of this rare species was collected by Claude Gay in the neighborhood of Copiapo, on the Atacama Desert of Chile, between 1834 and 1842. The type of Lippia gracilis was collected by Gustavo Flühmann at Salto de San Andreas, also in the Atacama Desert of Chile.

W. Fischer 12, Donat 52, and A. Ruiz s.n. [Herb. Mus. Argent. Cienc. Nat. 25/2212], as well as F. Kurtz 7049 -- all from Argentina -- were previously regarded by me as this species, but have proved to be A. seriphioides (A. Gray) Moldenke instead. A. trifida is apparently limited to the Atacama Desert of Chile.

The Anal. Univ. Chile 90: 620 reference given above is often cited as "1895". Gay says of this species: "Arbusto que se cria en la provincia de Copiapo y que podria ser de alguna utilidad por su mucha fragancia, lo mismo que las Lippia chilensis y citriodora, con las cuales forma un grupo perfectamente caracterizado por su traza y la forma de la flor y sobretodo del cáliz." Actually, "Lippia chilensis" [= Aloysia salviaefolia (Hook. & Arn.) Moldenke] does have its calyx long-hirsute as in Acantholippia, but "L. citriodora" [= A. triphylla (L'Hér.) Britton] does not! Sanzin, in the reference cited above, unites Lippia foliolosa A. Gray and L. floribunda R. A. Phil. with this species, as well as L. seriphioides A. Gray, but the first and third of these I regard as A. seriphioides (A. Gray) Moldenke and the second as Aloysia reichii Moldenke.

In all, only one herbarium specimen and 4 mounted photographs have been examined, but these include phototypes of all the

names involved.

Citations: CHILE: Atacama: Boel s.n. [Vallée du Río San Alberto, November 1924] (Br); Flühmann s.n. [Salto de S. Andreas; Herb. Mus. Nac. Chile 42419] (N--photo); C. Gay s.n. [Macbride photos 24673] (Kr--photo of isotype, N--photo of isotype, Sg--photo of isotype).

ADDITIONAL NOTES ON THE GENUS AMASONIA. V

Harold N. Moldenke

AMASONIA L. f.

Additional & corrected literature: Pers., Syn. Pl. 2: 141. 1807; Walp., Repert. Bot. Syst. 4: 124--125. 1845; Bocq., Adansonia 2: 87, 129, 130, 134, 144, 149, 155, 156, & 163, pl. 5, fig. 11--18 (1861) and 2: 180, 183, & 217--219. 1862; Bocq., Rev. Groupe Verbenac. 7, 49, 50, 54, 64, 69, 75, 76, & 87, pl. 5, fig. 11--18. 1862; Moldenke, Syst. Bot. Lect. 7, rev., 1. 1938; Moldenke, Brief Course Syst. Bot., ed. 2, 36. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 33, 36, 40, 71, & 86. 1942; Moldenke, Alph. List Cit. 1: 3, 6, 8, 11, 12, 15, 31, 37, 40, 44, 49, 55, 60, 64, 67, 68, 70, 79, 82, 92, 107, 112, 113, 116, 117, 121, 130--132, 135, 141, 142, 161, 165, 167, 168, 179, 194, 196, 198, 200, 205, 211, 212, 215, 217, 222--224, 237, 238, 248, 261, 264, 276, 286, 311, 317, 318, 322, & 323 (1946) and 2: 327, 330--334, 337, 341, 344, 346, 347, 350, 352, 361, 364, 365, 403, 409, 413, 422, 432, 435--437, 439, 444, 447, 448, 486, 487, 502, 528, 534, 544, 550, 553, 554, 556, 557, 565--567, 573, 577, 582, 603--605, 607, 608, 612, 624, 626, 630, 633, & 640. 1948; Moldenke, Notice Phyt. Subscr. [2]. 1948; Moldenke, Alph. List Cit. 3: 655, 666, 669, 670, 675, 684, 686, 687, 692, 694, 699, 701, 704, 708--712, 724, 726, 731, 739, 747, 749, 771, 773, 782, 810, 816, 824, 825, 832, 833, 846, 853, 855, 887--890, 892, 898, 905, 906, 935, 945, 951, 954--957, 969, & 975 (1949) and 4: 984--986, 993, 996, 1004--1009, 1014, 1015, 1020, 1035, 1043, 1044, 1046, 1050, 1052, 1056, 1064, 1066, 1067, 1069--1071, 1078, 1079, 1093, 1097, 1098, 1106, 1113, 1115, 1132, 1146, 1147, & 1231. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 57, 59, 62, 65, 67, 68, 75, 156, & 176. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 3. 1949; Moldenke, Phytologia 4: 452--456. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 383 & 398--399. 1955; Moldenke, Fam. 2 Verbenac. [2] & 17--18. 1955; Moldenke, Résumé 62, 65, 70, 74, 76, 78, 82, 87, 115, 213, 234, 278, 298, 352, 353, 407, 423, & 442. 1959; Rickett & Stafleu, Taxon 9: 84. 1960; Moldenke, Résumé Suppl. 2: 8. 1960.

Full explanation of the abbreviations for herbaria employed in this and all previous notes on this genus will be found in Phytologia 5: 154--159 (1955), 6: 242 (1958), 7: 91--92 (1959),

and 7: 123—124. 1960. Rickett & Stafleu, in the reference cited above, place the genus erroneously in the Boraginaceae.

AMASONIA ANGUSTIFOLIA Mart. & Schau.

Additional & corrected literature: Bocq., Adansonia 2: 219. 1862; Hook. & Jacks., Ind. Kew. 1: 103. 1893; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 86. 1942; Moldenke, Phytologia 2: 199. 1946; Moldenke, Alph. List Cit. 1: 79 & 223 (1946), 2: 331, 337, 432, 435, & 448 (1948), 3: 686, 692, 694, 955, & 957 (1949), and 4: 1113. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 176. 1949; Moldenke, Phytologia 4: 453—454. 1954; Moldenke, Résumé 87, 234, 352, & 442. 1959.

The species has been found at 425 meters elevation, blooming in November and December.

Additional citations: BRAZIL: Pará: Murça Pires, Black, Wurdack, & Silva 6062 (N, Z).

AMASONIA ARBOREA H.B.K.

Additional synonymy: Amasonia arborwa H.B.K. ex Moldenke, Alph. List Cit. 4: 1132, sphalm. 1949.

Additional & corrected literature: Walp., Repert. Bot. Syst. 4: 124. 1845; Hook. & Jacks., Ind. Kew. 1: 103. 1893; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32, 33, 36, & 86. 1942; Moldenke, Alph. List Cit. 1: 8, 40, 55, 79, 92, 107, 117, 121, 132, 222, & 223 (1946), 2: 448, 556, 557, 573, 587, 612, & 624 (1948), 3: 666, 709, 712, 816, & 955 (1949), and 4: 985, 1064, 1067, 1078, 1079, & 1132. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62, 65, 67, 68, 75, & 176. 1949; Moldenke, Phytologia 4: 454. 1953; Moldenke, Résumé 70, 74, 76, 78, 87, 234, & 442. 1959; Moldenke, Résumé Suppl. 2: 8. 1960.

Collectors describe this as a virgate or slender unbranched shrub, to 3 m. tall, leafy at the tip, the leaves membranous, dark-green above, pale-green beneath, with a prominent midrib, the young ones purple beneath, the bracts red, bright-red, or crimson to vermillion, the calyx rotate, bright-red or wine-red, the corolla white or cream-colored, with the tube pink-flushed. Maguire, Cowan, & Wurdack describe it as an "herb", 1 m. tall.

It has been found in clearings, gallery forests, small cerrados, forested areas, and rainforests. Maguire, Wurdack, & Bunting report it as "infrequent" in rainforests or "occasional" in lower slope forests. Maguire & Fanshawe found it to be "frequent" in Cunuria forests. Steyermark found it on steep slopes above a quebrada on southwest-facing slopes. It has been collected at altitudes up to 1400 meters, blooming in February, May, August, November, and December. Fróes & Black found it growing in virgin forests. The green fruit is said to be depressed-globose in shape. The plant has been collected in fruit in October and November.

Additional citations: VENEZUELA: Amazonas: Cardona 166 (Ca--734313); B. Maguire 33214 (N); Maguire, Cowan, & Wurdack 29458 (N), 29960 (N); Maguire & Politi 28055 (N); Maguire, Wurdack, &

Bunting 36787 (N). Bolívar: Bernardi 1503 (Ad); Steyermark 75388 (F--1442839). BRITISH GUIANA: Maguire & Fanshawe 32408 (N). BRAZIL: Amazonas: Luis & Francisco s.n. [Herb. Inst. Nac. Pesq. Amaz. 3638] (Ok). Gofas: E. Y. Dawson 14859 (Sm), 15013 (Z), 15026 (Sm). Pará: Fróes & Black 24435 (Be--50954).

AMASONIA CAMPESTRIS (Aubl.) Moldenke

Additional synonymy: Amazonia punicea Vahl ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960.

Additional & corrected literature: Walp., Repert. Bot. Syst. 4: 124. 1845; Bocq., Adansonia 2: 156 & 163, pl. 5, fig. 11--18 (1861) and 2: 219. 1862; Bocq., Rev. Groupe Verbenac. 76 & 87, pl. 5, fig. 11--18. 1862; Hook. & Jacks., Ind. Kew. 1: 103. 1893; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 33, 36, 71, & 86. 1942; Moldenke, Alph. List Cit. 1: 3, 6, 8, 11, 12, 15, 31, 37, 40, 44, 49, 60, 64, 67, 68, 70, 79, 82, 112, 113, 116, 121, 130, 131, 135, 142, 161, 165, 179, 194, 196, 198, 205, 211, 212, 215, 217, 222, 234, 237, 248, 261, 286, 311, 317, & 318 (1946), 2: 327, 331--334, 341, 344, 346, 347, 350, 364, 403, 409, 432, 436, 437, 439, 444, 447, 448, 487, 502, 528, 544, 554, 565, 567, 577, 582, 587, 603, 605, 608, 624, 626, 630, 633, & 640 (1948), 3: 655, 669, 670, 675, 684, 686, 687, 692, 694, 701, 708, 709, 711, 712, 724, 726, 731, 739, 747, 749, 773, 782, 810, 824, 825, 832, 833, 853, 887--889, 892, 898, 905, 906, 945, 951, 954, & 969 (1949), and 4: 993, 996, 1020, 1035, 1043, 1044, 1046, 1050, 1052, 1056, 1070, 1093, 1097, 1106, 1113, 1115, 1146, 1147, & 1221. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 57, 62, 65, 67, 68, 75, 156, & 176. 1949; Moldenke, Phytologia 4: 454--455. 1953; Moldenke, Résumé 62, 70, 74, 76, 78, 87, 213, 234, 352, 353, & 442. 1959; Rickett & Stafleu, Taxon 9: 84. 1960.

Additional illustrations: Bocq., Adansonia 2: pl. 5, fig. 11--18. 1861; Bocq., Rev. Groupe Verbenac. pl. 5, fig. 11--18. 1862.

Bocquillon, in the reference cited above (p. 7), says that "L'Amasonia (Linné) est un Clerodendron à corolle infundibulariforme, à feuilles alternes, à inflorescence en grappes terminales de cymes bipares", yet he keeps the genus as distinct and valid on succeeding pages of his work. He apparently based his concept of the genus on Spruce 3288, which he identified as A. punicea Vahl, but which is actually A. spruceana Moldenke.

Cowan has found A. campestris occasional on white sand of savannas. Black calls it a "perennial on campos", while Fróes calls it a small shrub with yellowish flowers, growing on the border of secondary forests on high land. Other collectors describe the plant as a "rhizomatous herb, the leaves borne near the top of the stem, flower-buds yellowish-green, the lower bracts green, variegated with white and red, the uppermost red or brick-red, the flowers yellow or pale-yellow. It has been collected in anthesis also in December, and in fruit in the same month. It ascends to 400 meters altitude in Venezuela.

Additional citations: VENEZUELA: Bolívar: Maguire, Wurdack, & Bunting 35955 (N, S). BRITISH GUIANA: R. Schomburgk 469 (N), III. 28 (N). SURINAM: Florschütz & Florschütz 1821 (N); Lanjouw & Lindeman 143 (N), 1589 (N), 1711 (N). FRENCH GUIANA: Cowan 38876 (N). BRAZIL: Amapá: Black 49-8372 (Be--53728). Amazonas: Fröes 22245 (Be--28792); J. S. Rodrigues 33 (Z). Bahia: Blanchet 3156 [Macbride photos 7887] (N--photo). Maranhão: Fröes 30799 (Be--82428).

AMASONIA HIRTA Benth.

Additional & corrected literature: Walp., Repert. Bot. Syst. 4: 125. 1845; Kuntze, Rev. Gen. Pl. 2: 509. 1891; Hook. & Jacks., Ind. Kew. 1: 103. 1893; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 40, & 86. 1942; Moldenke, Alph. List Cit. 1: 107, 117, 121, 200, 223, 238, 264, 276, & 286 (1946), 2: 331, 341, 361, 365, 413, 422, 432, 448, 486, 534, 550, & 553 (1948), 3: 686, 687, 692, 704, 710, 711, 824, 846, 855, 890, 906, 935, & 955-957 (1949), and 4: 984, 1066, 1069, 1098, & 1113. 1949; Moldenke, Phytologia 4: 456. 1953; Moldenke, Résumé 87, 115, 352, & 442. 1959.

Collectors state that this species inhabits meadow grasslands.

Additional citations: BRAZIL: Goiás: E. Y. Dawson 14726 (Im, Z). Matto Grosso: Martius 583 [Macbride photos 7886] (N--photo). Pará: Murça Pires, Black, Wurdack, & Silva 6494 (N). PARAGUAY: Hassler 10051 (N).

AMASONIA LASIOCAULOS Mart. & Schau.

Additional & corrected literature: Hook. & Jacks., Ind. Kew. 1: 103. 1893; Glaz., Bull. Soc. Bot. France 3: 545. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 86. 1942; Moldenke, Alph. List Cit. 1: 121, 132, 141, 167, 168, 322, & 323 (1946), 2: 330, 432, 550, 553, & 604 (1948), 3: 711, 712, & 731 (1949), and 4: 1015 & 1071. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 75, & 176. 1949; Moldenke, Phytologia 4: 456. 1953; Moldenke, Résumé 65, 82, 87, 234, 352, & 442. 1959.

Collectors describe the bracts of this species as blood-red and the corollas as yellowish or yellowish-white. The species has been collected in anthesis in August, growing at altitudes of 200-700 meters.

Additional citations: COLOMBIA: Amazonas: Kóie 5019 (Cp, Ok). Vaupés: Schultes & Cabrera 13381 (W--2113106). BRAZIL: Amazonas: Luis s.n. [Herb. Inst. Nac. Pesq. Amaz. 1349] (Ok). Pará: Fröes 27010 (Z).

AMASONIA OBOVATA Gleason

Additional & corrected literature: Moldenke, Syst. Bot. Lect. 7, rev., 1. 1938; Moldenke, Brief Course Syst. Bot., ed. 2, 36. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 86 (1942) and [ed. 2], 62 & 176. 1949; Moldenke, Phytologia 4: 456. 1953; Moldenke, Résumé 70 & 442. 1959.

AMASONIA SPRUCEANA Moldenke

Additional & corrected literature: Bocq., Adansonia 2: 219. 1862; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 36, 71, & 86. 1942; Moldenke, Alph. List Cit. 1: 132 (1946) and 2: 331, 337, & 448. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 84. 1948; Moldenke, Alph. List Cit. 3: 694, 955, & 956 (1949) and 4: 1004. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, 75, 156, & 176. 1949; Moldenke, Phytologia 4: 456. 1953; Moldenke, Résumé 65, 70, 87, 213, & 442. 1959.

Schultes reports that the bracts of this species are scarlet, the corolla green-yellow, and the fruit green. He collected the plant in flower in October, and in fruit in October and November, growing at altitudes of 600 to 850 feet.

Bocquillon (1861 & 1862) seems to base his discussion of A. punicea Vahl on Spruce 3288, which is the type collection of A. spruceana. His illustration, which is to typify the genus, however, seems to be based on a Leprieur specimen [1839] which he identified as "Amasonia erecta L." (this accreditation of the binomial to Linnaeus the elder is 77 years earlier than the 1939 citation given by me for it in Phytologia 4: 455). He uses the same accreditation on page 163 (1861) and 219 (1862) of his work as originally published in the second volume of Adansonia.

Additional citations: COLOMBIA: Vaupés: Schultes, Baker, & Cabrera 17949 (W-2113111), 18066 (W-2113112). BRAZIL: Pará: Black, Ledoux, & Accioly 52-14204 (Z).

ADDITIONAL NOTES ON THE GENUS BAILLONIA. I

Harold N. Moldenke

BAILLONIA Bocq.

Literature: Dumort., Anal. Fam. Pl. 22. 1829; Bartl., Ord. Nat. Pl. 180. 1830; Lindl., Nat. Syst. Bot., ed. 2, 278. 1836; Endl., Gen. Pl. 633-638. 1838; Meisn., Pl. Vasc. Gen. 290-292. 1840; Schau. in A. DC., Prodr. 11: 524-525. 1847; Bocq., Adansonia 2: 89, 109, 127, 130, 142, 146, & 147. 1861; Bocq., Rev. Groupe Verbenac. 9, 29, 47, 50, 62, 66, & 67. 1862; Bocq., Adansonia 2: 184, 185, 246-247, & 251, pl. 7. 1863; Miers, Trans. Linn. Soc. Lond. Bot. 27: 102-103. 1870; Benth. in Benth. & Hook. f., Gen. Pl. 2: 1132-1136 & 1143-1144. 1876; Benth., Journ. Linn. Soc. Lond. 20: 304-308. 1884; Baill., Bull. Soc. Linn. Paris 2: 880. 1890; Hook. & Jacks., Ind. Kew. 1: 264. 1893; S. M. Moore, Trans. Linn. Soc. Lond., ser. 2, 4: 437-439. 1895; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 144 & 152-153. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 250. 1898; Durand & Jacks., Ind. Kew. Suppl. 1: 50. 1901; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 23. 1904; Briq., Ann. Conserv. & Jard. Bot. Genève.

7-8: 316. 1904; Junell, Symb. Bot. Upsal. 4: 37--38, 47--50, & 213--214, fig. 89 & 90. 1934; Moldenke, Phytologia 1: 97--98. 1934; Moldenke in Fedde, Repert. 41: 135. 1936; Moldenke, Geogr. Distrib. Avicenn. 1, 25, 28, 29, & 35. 1939; Moldenke, Darwiniana 5: 166--177. 1941; Moldenke, Phytologia 2: 50. 1941; Moldenke, Prelim. Alph. List Invalid Names 6 & 16. 1940; Moldenke, Alph. List Invalid Names 5, 6, & 14. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 40, 42, 71, & 86. 1942; Moldenke, Alph. List Cit. 1: 11, 27, 200, 263, & 313 (1946) and 2: 458, 553, 599, 627, & 629. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 24, 31, 44, 46, 47, & 49, pl. 9, fig. 7 & 9. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75, 96, 98, 102, 156, & 176. 1949; Moldenke, Alph. List Cit. 3: 705, 748, 788, 869, & 893 (1949) and 4: 1020, 1035, 1113, & 1114. 1949; Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 347. 1951; Moldenke, Phytologia 5: 154--159. 1955; Moldenke, Résumé 87, 113, 115, 123, 213, 236, 256, 407, 423, & 442. 1959.

Since the publication of my original monograph of this small genus in Darwiniana 5: 166--177 (1941) some additional information about it has come to hand and will be published in a series of "Additional notes", of which this is the first. A list of the 259 institutional and private herbaria whose material has been examined, in whole or in part, in my monographic studies of the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae, with the abbreviations used for each in my citation of herbarium specimens, will be found in Phytologia 5: 154--159 (1955), 6: 242 (1958), 7: 91--92 (1959), and 7: 123--124 (1960) with the following additions:

Dt = Jesup Herbarium, Dartmouth College, Hanover, New Hampshire
 Fg = Arizona State College, Flagstaff, Arizona
 Gp = Ontario Agricultural College, Guelph, Ontario, Canada
 Ih = Instituto de Historia Natural, Curitiba, Paraná, Brazil
 Nb = Stephen F. Austin State College, Nacogdoches, Texas

Bocquillon, in Adansonia 2: 89 (1861), says "Les Baillonia ont pour fruit une drupe à deux noyaux latéraux, uniloculaires et monospermes. Ils sont aux Citharexylum ce que le Blairia est aux Priva. He bases his concept of the genus on Weddell 2193 and 3208. His work is cited by Stapf and others as "Bocq. in Baill., Adansonia". His thesis "Revue du groupe des Verbénacées" was plainly credited only to him on the title-page, as it was also when published in "Adansonia", but was dedicated by him "A mon père et a ma mère / a mon excellent maitre et ami M. H. Baillon". Stapf cites a plate 6 in the "Revue" and a plate 7 in "Adansonia", but I have seen neither of these plates -- there is no plate 7 in the New York copy of these works, while plate 6 depicts only Vitex incisa in the New York Botanical Garden copy.

Additional names for species excluded from the genus are the following:

Baillonia glauca Elliott ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940 = Diostea juncea (Gill. & Hook.)

Miers

- Baillonia juncea Benth. ex Moldenke, Alph. List Invalid Names 6, in syn. 1942 = Diostea juncea (Gill. & Hook.) Miers
- Baillonia juncea Benth. & Hook. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947 = Diostea juncea (Gill. & Hook.) Miers
- Baillonia juncea (Gill. & Hook.) Benth. & Hook. f. ex Moldenke, Prelim. Alph. List Invalid Names 6, in syn. 1940 = Diostea juncea (Gill. & Hook.) Miers
- Baillonia spicata Baill. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947 = Citharexylum ligustrinum Van Houtte

BAILLONIA AMABILIS Bocq.

Literature: see bibliography given under the genus as a whole.

Illustrations: Bocq., Rev. Groupe Verbenac. pl. 6. 1862; Bocq., Adansonia 2: pl. 7. 1863; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 150, fig. 58 E & F. 1895; Junell, Symb. Bot. Upsal. 4: fig. 89 & 90. 1934; H. N. & A. L. Moldenke, Pl. Life 2: pl. 9, fig. 8 & 9. 1948.

Recent collectors describe the corolla as yellow and the plant as a shrub 1--4 meters tall, with light bark, blooming also in February and June, found at altitudes of 100 to 506 meters on sandstone hill slopes, in swamps and palm woods, and at the edge of lagoons that are half-submerged at flood time. One of the Anisits 2098 specimens cited from the Stockholm herbarium in my original monograph has now been transferred to the Britton Herbarium at the New York Botanical Garden. The cotype collection, Weddell 2193, is erroneously listed as "3193" by me in my Alph. List Cit. 4: 1113 (1949).

Additional citations: PARAGUAY: Fiebrig 1207 (S), 1207a (S); Hassler 2638 (Ca--929811, N), 2638a (N); T. Rojas 1893 [Herb. Hort. Parag. 10076; Herb. Osten 13560] (S, Ug); Sandeman 4832 (K); Weddell 3208 (B--cotype). BOLIVIA: Santa Cruz: Cárdenas 4522 (N). ARGENTINA: Formosa: I. Morel 825 (N, S); Jürgensen 1983 [Herb. Osten 13792] (Ug).

BAILLONIA AMABILIS var. PUBESCENS Moldenke

Literature: Moldenke, Phytologia 2: 50. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 86. 1942; Moldenke, Alph. List Cit. 2: 553. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 176. 1949; Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 347. 1951; Moldenke, Résumé 87 & 442. 1959.

This variety differs from the typical form of the species in having its twigs, branchlets, petioles, and both leaf-surfaces densely short-pubescent, the rachis and bracts densely puberulent or short-pubescent, and the calyx more or less puberulent.

The type of the variety was collected by Frederico Carlos Hoehne [Com. Rondon 4739] at Triunpho, Rio São Lourenço, Matto Grosso, Brazil, in February, 1911, and is deposited in the herb-

arium of the Departamento do Botânica do Estado at São Paulo, Brazil.

Citations: BRAZIL: Matto Grosso: F. C. Hoehne, Com. Rondon 4739 (N—isotype, N—photo of type, Sp—type, Z—photo of type).

ADDITIONAL NOTES ON THE GENUS BOUCHEA. III

Harold N. Moldenke

Since the publication of my monograph of this genus and the first two series of additional notes thereto, numerous additional specimens have been examined and supplementary information has come to light. Full explanation of the abbreviations used for the names of herbaria in which specimens are deposited will be found in *Phytologia* 5: 154--159 (1955), 6: 242 (1958), 7: 91-92 (1959), 7: 123--124 (1960), and 7: 343 (1961).

BOUCHEA Cham.

Additional & corrected literature: L., *Syst. Nat.*, ed. 10, 852. 1759; Walp., *Repert. Bot. Syst.* 4: 11--12, 34, & 38--39. 1845; Turcz., *Bull. Soc. Nat. Imp. Mosc.* 36 (2): 199. 1863; Jacks., *Ind. Kew.* 2: 974. 1895; Moldenke, *Alph. List Cit.* 1: 2, 5--8, 10, 11, 13--15, 17, 21, 26, 28--31, 33, 38--41, 45, 48, 49, 52, 53, 55, 57, 62--66, 74, 76, 79, 88, 92, 94, 106, 107, 115, 117, 118, 120, 121, 125, 127, 128, 131, 133, 134, 136, 139, 140, 148, 160--162, 169--171, 177--185, 188--190, 192, 194--198, 202, 203, 208, 209, 212, 216--218, 223, 227, 228, 232--234, 236, 238, 241--243, 247, 248, 250, 255, 258--261, 266, 269, 271--274, 277, 285, 286, 299--303, 305--309, 311--316, 318, 319, 321, & 323--325 (1946), 2: 327--329, 331, 333, 336--338, 340, 342, 344, 346--350, 352, 353, 361, 365, 368, 371, 377, 392, 394, 395, 401--403, 408, 413, 415--417, 422--430, 434, 436, 437, 442, 446--449, 459, 473, 474, 477, 478, 486, 489, 499, 500, 503, 518, 525, 528--530, 533--536, 539--543, 549--553, 557, 558, 561, 563, 564, 570, 578, 595, 596, 601, 603--607, 610--612, 616, 618, 621, 623, 625, 626, 629, 631, 633, 639, 642, 645, & 652 (1948), 3: 653, 654, 656, 658, 659, 663, 664, 666, 670, 675--677, 679, 683--686, 690, 691, 695, 705, 706, 710--714, 716, 717, 720, 722, 726, 729, 730, 738, 741, 748, 749, 754, 755, 759, 766, 768, 772, 779, 783, 785, 786, 788, 789, 796, 798--800, 803, 807, 808, 811, 813, 814, 817--819, 822--826, 828--830, 833, 834, 838, 842, 843, 845, 848, 853--856, 862, 865, 871, 872, 876--878, 883--886, 888--891, 893, 894, 898, 903, 904, 906--908, 911, 915, 918, 919, 921, 923, 924, 927--930, 933, 935, 937--939, 948, 951, 952, 956, 958, 961, 964, 968--970, 974, & 977 (1949), and 4: 979, 981, 982, 991, 993, 995, 997, 1001, 1006, 1010, 1012, 1013, 1015, 1016, 1019, 1020, 1022, 1024--1028, 1030--1033, 1035, 1037--1047,

1050--1057, 1060--1064, 1067--1069, 1071, 1074--1076, 1078, 1081, 1082, 1085, 1087, 1095, 1096, 1106, 1113--1115, 1123, 1124, 1126, 1127, 1130, 1132, 1136, 1143, 1144, 1146, 1148, 1153, 1171, 1172, 1178, 1206, 1208, 1211, 1212, 1215, 1228, 1231, 1232, 1240, 1244, 1246, 1247, 1254, 1286, 1290, 1295, 1297, 1300, & 1301. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 3. 1949; Moldenke, Phytologia 4: 486--504 (1954) and 5: 6--7. 1954; Biol. Abstr. 28: 3196. 1954; Trav. Lab. Bot. Syst. Brux. 16: 66. 1955; Assoc. Etud. Tax. Pl. Afr. Trop. Index 1954: 66. 1955; Alain in León & Alain, Fl. Cuba 4: 279 & 294. 1957; Moldenke, Résumé 14, 27, 30, 31, 34, 41, 43--45, 49, 50, 54, 56, 58--61, 64, 65, 70, 79, 82, 87, 113, 118, 123, 213, 237--240, 277, 294, 318, 320, 342, 346--349, 353, 356, 358, 363, 364, 368, 372--374, 393, 394, 406, 416, 423, & 443. 1959; Moldenke, Résumé Suppl. 1: 7, 15, & 16. 1959; Angely, Fl. Paran. 15: 12 & 24 (1960) and 16: 42. 1960; Rickett & Stafleu, Taxon 9: 84. 1960.

In the Biological Abstracts reference cited above there is a report of an Elsinoë fungus occurring as a parasite on Bouchea in Cuba. Rickett & Stafleu (1960) place the genus Bouchea erroneously in the Boraginaceae. They state that the conservation of the generic name Bouchea Cham., Linnaea 7: 252 (1832), was actually superfluous because the earlier rival name Denisiaea Neck., while first published in his Elem. Bot. 1: 306 (1790) was not validated under the present edition of the International Rules of Nomenclature until September 28, 1898, by Kuntze, Rev. Gen. Pl. 3 (3): 250.

BOUCHEA AGRESTIS Schau.

Additional literature: Moldenke, Phytologia 4: 488. 1954; Moldenke, Résumé 87, 238, 416, & 443. 1959.

Additional citations: BRAZIL: Minas Gerais: A. Lutz 30 (Z).

BOUCHEA BOYACANA Moldenke

Additional literature: E. J. Salisb., Ind. Kew. Suppl. 11: 34. 1953; Moldenke, Phytologia 4: 489. 1954; Moldenke, Résumé 65 & 443. 1959.

Additional citations: COLOMBIA: Cauca: Triana s.n. [Popayan] (Bm).

BOUCHEA CHASCANOIDES Moldenke

Additional literature: E. J. Salisb., Ind. Kew. Suppl. 11: 34. 1953; Moldenke, Phytologia 4: 489. 1954; Moldenke, Résumé 87 & 443. 1959.

BOUCHEA CIPOËNSIS Moldenke

Additional literature: E. J. Salisb., Ind. Kew. Suppl. 11: 34. 1953; Moldenke, Phytologia 4: 489. 1954; Mendes Magalhaes, Anais V Reun. Anual Soc. Bot. Bras. 254--255 & 303. 1956; Moldenke, Résumé 87 & 443. 1959.

The species is said to bloom from September to November. The paper by Mendes Magalhaes, cited above, describes the species as

"n. sp." at that point, but it was actually first validly described and published by me six years previous to that date in *Phytologia* 3: 261—262 (1950).

BOUCHEA FLUMINENSIS (Vell.) Moldenke

Additional synonymy: Verbena pseudo-gervão St. Hil. ex Walp., *Repert. Bot. Syst.* 4: 34, in syn. 1845. Bouchea luminensis (Vell.) Moldenke ex H. N. & A. L. Moldenke, *Anal. Inst. Biol. Mex.* 20: 3, sphalm. 1949. Verbena pseudogervao A. St. Hil. apud Rickett & Stafleu, *Taxon* 9: 84, in syn. 1960.

Additional literature: Walp., *Repert. Bot. Syst.* 4: 34. 1845; Stapf, *Ind. Lond.* 6: 429 & 431. 1931; Moldenke, *Alph. List Cit.* 1: 11. 1946; E. J. Salisb., *Ind. Kew. Suppl.* 10: 33 (1947) and 11: 34. 1953; Moldenke, *Phytologia* 4: 490—493. 1954; Rambo, *Sellowia* 6: 59, 67, & 153. 1954; Goodspeed & Stork, *Univ. Calif. Publ. Bot.* 28: 129. 1955; Moldenke, *Résumé* 79, 82, 87, 113, 118, 123, 213, 239, 347—349, 364, 368, 373, 416, & 443. 1959; Moldenke, *Résumé Suppl.* 1: 7 & 16. 1959; Rickett & Stafleu, *Taxon* 9: 84. 1960; Angely, *Fl. Paran.* 16: 42. 1960.

Illustrations: A. St. Hil., *Pl. Usuel. Bras.* pl. 40. 1826; Vell., *Fl. Flum. Icon.* 1: pl. 38. 1827; *Bot. Mag.* 102: pl. 6221 (in color). 1876.

The stem is described by some collectors as green with a purple hue, the calyx green, the corolla varying from blue to deep-purple, "pale-purple with a white center", or "violet and white". In addition to the habitats recorded previously, the species has also been found in waste land, along sunny paths and roadsides, and in tropical forests. Woytkowski describes the stem, calyx, and fruit as "slightly hairy", the lower part of the plant somewhat woody, or the calyx and stem "hairy", the leaves "soft, thick, velvety and covered with very short hair". He says that the plant is abundant in San Martín, Peru. Irwin found the species growing in red clay soil in the partial shade of secondary forests, common, with pale red-violet corollas; Pedersen found it in moist thickets by rivers; while Jürgens describes it as an erect branched evergreen, to 2.5 m. tall, somewhat woody, with dark-green leaves which are cooked with the young buds in the treatment of colds and to induce sweating. He found the species growing between bushes in sunny dry ground, on old cultivated ground of campos, at an altitude of 70 meters.

Additional citations: PERU: Junin: Ferreyra 382 (Ss), 3707 (Ss). San Martín: Klug 4206 (Ca—710174); Woytkowski 35004 (Ca—13825), 35105 (Ca—14022). BRAZIL: Gofas: Brade 15469 (B). Matto Grosso: A. Lutz 1452 (Lz). Minas Gerais: Irwin 2239 (W—2281285); Macedo 2044 (S). Rio Grande do Sul: Henz 35480 (N); Jürgens 105 (B); Rambo 48893 (Vi). Santa Catarina: A. Lutz 643 (Z); Reitz & Klein 3497 [*Herb. Reitz* 14213] (N, Sm). ARGENTINA: Corrientes: Pedersen 2914 (N). CULTIVATED: Brazil: Stellfeld 2336 (S).

BOUCHEA FLUMINENSIS var. PILOSA Moldenke

Additional literature: Moldenke, *Phytologia* 4: 493. 1954; Moldenke, *Résumé* 87, 123, & 443. 1959; Angely, *Fl. Paran.* 16: 42. 1960.

Additional citations: ARGENTINA: Misiones: A. G. Schulz 2895 (Sz).

BOUCHEA LINIFOLIA A. Gray

Additional literature: Moldenke, *Phytologia* 4: 494--495, fig. 1--6. 1954; Moldenke, *Résumé* 27, 30, 34, & 443. 1959.

Illustrations: Moldenke, *Phytologia* 4: 494, fig. 1--6. 1954.

E. F. Castetter, in a letter to me dated January 31, 1955, states that in twenty-seven years of botanizing and collecting plants in New Mexico he has never seen this species in that state.

Additional citations: TEXAS: Val Verde Co.: Cory 41687 (N, We).

BOUCHEA NELSONII Grenz.

Additional literature: Moldenke, *Phytologia* 4: 495. 1954; Moldenke, *Résumé* 34, 41, 239, & 443. 1959.

Steyermark describes the corolla as lavender, records the common name "vervena", and says that the boiled leaves are used for making an infusion for drinking 3 times daily in the treatment of malaria and chills. He found the plant growing on bald knobs.

Additional citations: GUATEMALA: Huehuetenango: Steyermark 51464 (N).

BOUCHEA PRISMATICA (L.) Kuntze

Additional synonymy: Bouchea ehrembergii Cham. ex Roig, *Dicc. Bot.* 2: 910 & 991, in syn. 1953. Bouchea prismatica var. prismatica [Alain] in León & Alain, *Fl. Cuba* 4: 294. 1957.

Additional literature: L., *Syst. Nat.*, ed. 10, 852. 1759; Moldenke, *Alph. List Cit.* 1: 2, 5, 7, 10, 11, 15, & 17. 1946; Standen, *Bol. Soc. Venez. Cienc. Nat.* 14 (78): 62. 1952; Roig, *Dicc. Bot.* 2: 910 & 991. 1953; Palacios Rincón, *Bol. Soc. Bot. Mex.* 17: 30. 1954; Moldenke, *Phytologia* 4: 495--498 (1954) and 5: 6. 1954; Alain in León & Alain, *Fl. Cuba* 4: 294--295, fig. 127. 1957; J. & G. C. Rzedowski, *Act. Cientif. Potos.* 1: 49. 1957; Moldenke, *Résumé* 31, 34, 41, 45, 49, 50, 54, 56, 58--60, 64, 65, 70, 79, 87, 213, 237--240, 277, 294, 318, 347, 349, 353, 356, 358, 372, 374, 394, 423, & 443. 1959.

Illustrations: Jacq., *Icon. Pl. Rar.* 2: pl. 208 (in color). 1788; Bocq., *Rev. Groupe Verbenac.* pl. 16. 1863; Briq. in Engl. & Prantl, *Nat. Pflanzenfam.* 4 (3a): 153, fig. 59 A & B. 1895; Knuth, *Handb. Blütenbiol.* 3 (2): 72. 1905; Alain in León & Alain, *Fl. Cuba* 4: fig. 127. 1957.

Collectors describe this plant as a spreading herb about 4 feet tall, the stem and roots woody, the flowers falling easily, and the corollas rose or purplish-pink. Allen says that the

flowers are pink-purple, with the center white, blooming in September. Alain calls the plant "verbena cimarrona", while Box says that it is infrequent and very local on limestone in Antigua. Standen reports it as the host plant for a species of Oidium.

The Jacquin reference cited above is often dated "1789".

Additional citations: CUBA: Oriente: Clemente 2668 (Z). LEEWARD ISLANDS: Antigua: Box 1197 (N). COLOMBIA: Antioquia: Daniel 3905 (F--1296264). Magdalena: C. Allen 517 (S). Tolima: Haught 6345 (W--2045947). VENEZUELA: Carabobo: Asplund 15104 (S). Federal District: H. Pittier 7887 (Vi).

BOUCHEA PRISMATICA var. BREVIROSTRA Grenz.

Additional synonymy: Stachytarpheta laxiflora Turcz., Bull. Soc. Nat. Imp. Mosc. 36 (2): 199. 1863.

Additional literature: Turcz., Bull. Soc. Nat. Imp. Mosc. 36 (2): 199. 1863; Hook. & Jacks., Ind. Kew. 2: 974. 1895; Moldenke, Alph. List Cit. 1: 13, 14, & 16. 1946; Rzedowski, Anal. Esc. Nac. Cienc. Biol. 8: 105. 1954; Moldenke, Phytologia 4: 498--499 (1954) and 5: 6. 1954; Rzedowski, Ciencia 15: 148. 1955; Moldenke, Résumé 27, 31, 34, 41, 45, 59, 61, 64, 65, 294, 320, 346, 347, 363, 393, 394, & 443. 1959.

Steyermark describes the corolla of this plant as lavender and records a common name "shep-don". He found the plant growing at altitudes of 800 to 1200 meters, while Langenheim found it at 500 meters along railroad cuts in shrubby associations.

Additional citations: MEXICO: Federal District: G. L. Fisher s.n. [Tlalpam, Aug. 3, 1924] (Vi); Zamora, Paxson, & Barkley 16M902 (N). Tamaulipas: Stanford, Lauber, & Taylor 2302 (N). GUATEMALA: Huehuetenango: Seler & Seler 3072 (B); Steyermark 51588 (N). COLOMBIA: Norte de Santander: Linden 1350 (Z--photo, Z--photo). Santander: Langenheim 3001 (W--2266576).

BOUCHEA PRISMATICA var. LACINIATA Grenz.

Additional literature: Moldenke, Phytologia 4: 501. 1954; Moldenke, Résumé 34, 238, 368, & 443. 1959.

Matuda collected this plant at 750 meters altitude.

Additional citations: MEXICO: México: Matuda 31306 (Z).

BOUCHEA PRISMATICA var. LONGIROSTRA Grenz.

Additional literature: Moldenke, Alph. List Cit. 1: 6. 1946; Moldenke, Phytologia 4: 501--503. 1954; Alain in León & Alain, Fl. Cuba 4: 295. 1957; Moldenke, Résumé 14, 34, 43, 44, 49, 50, 54, 56, 58, 64, 65, 70, & 443. 1959.

Pittier describes this as an erect plant forming colonies in fertile waste places along roads; Glassman says that the flowers are light-blue and that the plant grows in the shade of trees in pine-oak forests. Yuncker describes it as an herb 2 feet tall, with lavender flowers in November. Holdridge describes the flowers as pinkish-purple, blooming in March, and the leaves lighter green beneath than above. Standley found the plant growing in

mimosa thickets.

Additional citations: HONDURAS: Morazán: Glassman 1869 (N, Ok, Ur); P. C. Standley 22161 (N). CUBA: Havana: León 540 (Vi). Oriente: Clément 7002 (Vi); Ekman 6213 (N). Province undetermined: León s.n. (Vi--1655). HISPANIOLA: Haïti: Holdridge 1042 (N). JAMAICA: Sangster 564 (N); Yuncker 17366 (Bm, S). VENEZUELA: Federal District. H. Pittier 7887 (Ca--923567).

BOUCHEA PSEUDOCASCANUM (Walp.) Grenz.

Additional literature: Moldenke, Alph. List Cit. 1: 8. 1946; Moldenke, Phytologia 4: 503. 1954; Moldenke, Résumé 87, 213, 238, 239, 347, 349, & 443. 1959.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 33. 1851; Bot. Tidssk. 8: pl. 2 (in color). 1874; Junell, Symb. Bot. Upsal. 4: fig. 29, 44, 46, 49, & 53. 1934.

ADDITIONAL NOTES ON THE GENUS CASSELIA. II

Harold N. Moldenke

My original monograph of this genus was published in 1936 under the title "A monograph of the genus Timotocia" in Fedde, Repert. 39: 129--153, and the first supplement in 1947 as "Additional notes on the genus Timotocia. I" in Phytologia 2: 242--246. Since this time it has been found necessary because of the unfortunate policy of "nomina conservanda" adopted and maintained by the International Rules of Botanical Nomenclature to abandon the generic name Timotocia and to reinstate Casselia (1823) in spite of the earlier homonymous Casselia Dumort. (1822).

CASSELIA Nees & Mart., Nov. Act. Physico-med. Acad. Caes.

Leopold.-Carol. Nat. Cur. 11: 73, pl. 6. 1823 (nom. conserv.) [not Casselia Dumort., 1822].

Additional literature: Jacks., Ind. Kew. 1: 449. 1893; Troncoso, Darwiniana 5: 31--40, fig. 1--3. 1941; Moldenke, Lilloa 6: 434--435. 1941; Moldenke, Alph. List Invalid Names Suppl. 1: 4. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 233 & 251. 1947; Moldenke, Phytologia 2: 242--246. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 22--24, 31, & 73. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93, 97, 163, & 197. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 178. 1953; Moldenke, Phytologia 5: 132. 1955; Biol. Abstr. 30: 4331 & 4397. 1958; Moldenke, Résumé 87, 113, 115, 116, 214, 250, 283, 354, 407, 423, & 445. 1959; Moldenke, Résumé Suppl. 1: 23. 1959; Rickett & Stafleu, Taxon 9: 84. 1960.

Rickett & Stafleu, in the reference cited above, erroneously place this genus in the Boraginaceae.

CASSELLIA CHAMAEDRYFOLIA Cham., Linnaea 7: 365. 1832.

Literature: Cham., Linnaea 7: 365. 1832; Moldenke in Fedde, Repert. 39: 143—145. 1936; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Prelim. Alph. List Invalid Names 14. 1940; Moldenke, Alph. List Invalid Names 12. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 100 (1942) and [ed. 2], 93 & 197. 1949; Moldenke, Résumé 87, 354, & 445. 1959.

The binomial "Timotocia chamaedrioides (Cham.) Mold." appearing on certain herbarium sheets apparently applies to the unrelated Verbena campestris Moldenke.

CASSELLIA GLAZIOVII (Briq. & Moldenke) Moldenke, Phytologia 2: 132. 1955.

Literature: Moldenke in Fedde, Repert. 39: 145—146. 1936; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 100. 1942; Moldenke, Phytologia 2: 244. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 233. 1947; Moldenke, Alph. List Cit. 1: 78, 79, & 238 (1947) and 2: 361. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 61. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93 & 197. 1949; Moldenke, Alph. List Cit. 3: 824 (1949) and 4: 1086. 1949; Moldenke, Phytologia 5: 132. 1955; Moldenke, Résumé 87, 354, & 445. 1959.

Additional citations: BRAZIL: Gofas: Smith & Macedo 4684 (W—2248213). Minas Gerais: Macedo 587 (S), 2655 (S, S, S).

CASSELLIA INTEGRIFOLIA Nees & Mart., Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur. 11: 76, pl. 6, fig. B. 1823.

Literature: Nees & Mart., Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur. 11: 76, pl. 6, fig. B. 1823; Hook. & Jacks., Ind. Kew. 1: 449. 1893; Moldenke in Fedde, Repert. 39: 135—136. 1936; Moldenke, Geogr. Distrib. Avicenn. 26 & 40. 1939; Moldenke, Prelim. Alph. List Invalid Names 14. 1940; Moldenke, Alph. List Invalid Names 12. 1942; Walp., Repert. Bot. Syst. 4: 40. 1845; Schau. in A. DC., Prodr. 11: 527. 1847; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38, 74, & 100. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 43. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93, 163, & 197. 1949; Moldenke, Résumé 87, 214, 250, 354, & 445. 1959.

Illustrations: Nees & Mart., Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur. 11: pl. 6, fig. B. 1823.

CASSELLIA INTEGRIFOLIA var. FISCHERI (Mart.) Moldenke, Phytologia 5: 132. 1955.

Literature: Moldenke in Fedde, Repert. 39: 136—137. 1936; Moldenke, Geogr. Distrib. Avicenn. 40. 1939; Moldenke, Prelim. Alph. List Invalid Names 14. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38, 74, & 100. 1942; Moldenke, Alph. List Invalid Names 12. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 43. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 59. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 163 & 197. 1949;

Moldenke, *Phytologia* 5: 132. 1955; Moldenke, *Résumé* 214, 250, 283, 354, & 445. 1959.

CASSELIA MANSOI Schau. in A. DC., *Prodr.* 11: 527. 1847.

Literature: Schau. in A. DC., *Prodr.* 11: 527. 1847; Moldenke in Fedde, *Repert.* 39: 142--143. 1936; Moldenke, *Geogr. Distrib. Avicenn.* 26 & 28. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 14. 1940; Moldenke, *Lilloa* 6: 434--435. 1941; Moldenke, *Alph. List Invalid Names* 12. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 38, 40, & 100 (1942) and [ed. 2], 93, 97, & 197. 1949; Moldenke, *Résumé* 87, 113, 250, 354, & 445. 1959.

CASSELIA ROSULARIS Sandw., *Kew Bull.* 1929: 124. 1929.

Literature: Sandw., *Kew Bull.* 1929: 124. 1929; Hill, *Ind. Kew. Suppl.* 8: 42. 1933; Moldenke in Fedde, *Repert.* 39: 150--151. 1936; Moldenke, *Geogr. Distrib. Avicenn.* 26. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 14. 1940; Moldenke, *Alph. List Invalid Names* 12. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 38 & 100. 1942; Moldenke, *Alph. List Cit.* 1: 119. 1947; Moldenke, *Phytologia* 2: 245. 1947; E. J. Salisb., *Ind. Kew. Suppl.* 10: 233. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 93 & 197. 1949; Moldenke, *Résumé* 87, 354, & 445. 1959.

Additional citations: BRAZIL: Gofas: Macedo 2658 (S).

CASSELIA SERRATA Nees & Mart., *Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur.* 11: 75, pl. 6, fig. A. 1823.

Literature: Nees & Mart., *Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur.* 11: 75, pl. 6, fig. A. 1823; Walp., *Repert. Bot. Syst.* 4: 40. 1845; Schau. in A. DC., *Prodr.* 11: 527. 1847; Hook. & Jacks., *Ind. Kew.* 1: 449. 1893; Moldenke in Fedde, *Repert.* 39: 137--138. 1936; Moldenke, *Geogr. Distrib. Avicenn.* 26. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 14. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 38 & 100. 1942; Moldenke, *Alph. List Invalid Names* 12. 1942; E. J. Salisb., *Ind. Kew. Suppl.* 10: 43. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 93 & 197. 1949; Moldenke, *Résumé* 87, 250, 354, & 445. 1959.

Illustrations: Nees & Mart., *Nov. Act. Physico-med. Acad. Caes. Leopold.-Carol. Nat. Cur.* 11: pl. 6, fig. A. 1823.

CASSELIA VERONICAEFOLIA Cham., *Linnaea* 7: 364. 1832.

Literature: Cham., *Linnaea* 7: 364. 1832; Walp., *Repert. Bot. Syst.* 4: 39--40. 1845; Schau. in A. DC., *Prodr.* 11: 528. 1847; Moldenke in Fedde, *Repert.* 39: 146--148. 1936; Moldenke, *Geogr. Distrib. Avicenn.* 26. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 14. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 38 & 100. 1942; Moldenke, *Alph. List Invalid Names* 12. 1942; E. J. Salisb., *Ind. Kew. Suppl.* 10: 43. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 93 & 197. 1949; Moldenke, *Résumé* 87, 354, & 445. 1959.

ADDITIONAL NOTES ON THE GENUS CHASCANUM. III

Harold N. Moldenke

Full explanation of the abbreviations used in this work for the names of herbaria in which cited specimens are deposited will be found in *Phytologia* 5: 143--159 (1955), 6: 242 (1958), 7: 91--92 (1959), 7: 123--124 (1960), and 7: 343 (1961).

CHASCANUM E. Mey.

Additional literature: Chiov., *Fl. Somalia* [1]: 274. 1929; Xavier Louis & Monod, *Bull. Agenc. Gén. Colon.* 27: 605. 1934; Moldenke in Fedde, *Repert.* 41: 62 & 134. 1936; Hill, *Ind. Kew. Suppl.* 9: 61. 1938; Monod, *Com. Ét. Hist. & Sc. Afr. Occid. Franç., sér. B*, 5: pl. 21. 1940; Hutchinson & Bruce, *Kew Bull.* 1941: 176. 1941; Moldenke, *Alph. List Cit.* 1: 4, 6, 9, 11, 15, 25, 27--31, 33, 40, 42, 49--51, 54, 56, 57, 59, 71, 73, 74, 78, 80, 98, 101--104, 112--115, 117, 118, 120, 122, 123, 128, 130, 131, 141, 153, 154, 156, 162, 164, 165, 174, 176, 178, 183, 190, 193, 196, 204, 206, 210, 215, 219, 220, 224, 234, 235, 243, 247, 248, 250, 255, 261, 267, 270, & 275--277. 1946; E. J. Salisb., *Ind. Kew. Suppl.* 10: 33 & 49. 1947; Moldenke, *Alph. List Cit.* 2: 332, 342, 352, 354, 355, 358, 402, 408, 410, 415--417, 430, 434, 435, 448, 489, 490, 497, 501, 536, 537, 550, 554, 556--559, 561, 576, 577, 580, 581, 598, 601, 614, 619--621, 626, 627, 629--631, 641, 644, & 645 (1948), 3: 659, 663, 671--675, 684, 685, 700, 706, 707, 712, 721, 732, 740, 747, 748, 750, 754, 761--763, 769, 770, 780, 783, 784, 802, 803, 808, 811--813, 816, 822, 825--827, 832, 841, 847--849, 858, 866, 877, 878, 885, 887, 891, 895, 898, 900--903, 907, 916, 917, 931, 935, 945, 946, 949, 952, 968, 969, & 976 (1949), and 4: 981, 983, 985, 993--997, 1004, 1010, 1012, 1014, 1016, 1030, 1038, 1068, 1069, 1093, 1094, 1098--1100, 1118, 1135, 1139, 1140, 1147, 1151, 1154, 1156, 1179, 1232, 1296, & 1298. 1949; E. J. Salisb., *Ind. Kew. Suppl.* 11: 51. 1953; Moldenke, *Phytologia* 4: 439--450. 1953; Hauman, *Assoc. Etud. Tax. Fl. Afr. Trop. Index* 1954; Gillett, *Kew Bull.* 1955: 131--135. 1955; *Assoc. Etud. Tax. Fl. Afr. Trop. Index* 1955: 63. 1956; Moldenke in Humbert, *Fl. Madag.* 174: 16--20 & 265. 1956; *Biol. Abstr.* 30: 3845 & 4395. 1958; Moldenke, *Résumé* 132--135, 140, 143, 145, 146, 148, 150--152, 155, 157--159, 214, 238--240, 250, 251, 277, 295, 297, 298, 302, 334, 335, 341, 342, 348, 406, 423, 426, 445, & 446. 1959.

Gillett gives an excellent key in *Kew Bull.* 1955: 131--132 (1955) to the species of this genus known from the eastern and northeastern sections of tropical Africa and Arabia and suggests that additional new species will be found in this "unknown horn of Africa". His key is worth repeating here:

1. Leaves not linear.

2. Leaf-blades essentially truncate at the base, the outer portion forming an angle of 80--90° with the midrib, the inner portion (which is attenuate into the petiole) shorter

than the unwinged petiole.

3. Calyx about 6 mm. long, less than twice as long as the subtending bractlet; tertiary veins prominent on the lower leaf-surface; indumentum of relatively sparse bristly hairs of unequal length, some of those on the stems and petioles being up to 1 mm. long; corolla-limb white or cream-colored.....C. marrubifolium.
- 3a. Calyx about 8 mm. long, more than twice as long as the subtending bractlet; tertiary veins not prominent on the lower leaf-surface; indumentum of dense very short hairs, all less than 0.1 mm. long; corolla-limb brownish-yellow or purplish.....C. arabicum.
- 2a. Leaf-blades not truncate at the base, the outer portion forming an angle of less than 50° with the midrib, passing gradually into the inner portion, which is longer than the unwinged petiole (if any); calyx more than twice as long as the subtending bractlet.
4. Inflorescence without long spreading hairs, with a dense short indumentum not more than 0.2 mm. long.
5. Corolla-limb dark brownish-yellow or purplish; bractlets about 3 mm. long; calyx 6--8 mm. long; corolla-tube not more than 18 mm. long; usually some long hairs, as well as short ones, on the stems and leaf-base..C. gillettii.
- 5a. Corolla-limb white or cream-colored; bractlets about 2 mm. long; calyx about 8 mm. long; corolla-tube usually over 20 mm. long; short hairs only throughout the plant.....C. sessilifolia.
- 4a. Inflorescence with long spreading hairs (0.4--1 mm. long) as well as relatively sparse short ones; corolla-limb white or cream-colored.
6. Leaves attenuate at the base into a petiole which is often fairly long; corolla not more than 25 mm. in length.....C. hildebrandtii.
- 6a. Leaves lanceolate, not attenuate at the base, almost sessile; corolla about 30 mm. long.....C. hanningtonii.
- 1a. Leaves linear, entire; corolla-tube 10--12 mm. long.....C. rariflorum.

CHASCANUM ADENOSTACHYUM (Schau.) Moldenke

Additional literature: Hook. & Jacks., Ind. Kew. 1: 327. 1893; Prain, Ind. Kew. Suppl. 3: 27. 1908; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Phytologia 4: 440. 1953; Gillett, Kew Bull. 1955: 135. 1955; Moldenke, Geogr. Distrib. Avicenn. 30 & 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45, 51, 52, & 87 (1942) and [ed. 2], 110, 119, 121, & 178. 1949; Moldenke, Résumé 135, 148, 152, 238, 251, & 445. 1959.

As Gillett has aptly pointed out (1955), the Lort Phillips s. n. [Wagga Mts., 1897] and s.n. [Rugger Pass], cited by me in Revisit Sudam. Bot. 6: 16 (1939) as this species, are actually C. gillettii Moldenke. The true C. adenostachyum is not known from Somaliland; it is confined to southern Africa.

CHASCANUM AFRICANUM Moldenke

Gillett has pointed out, in the reference cited above, that this plant is actually conspecific with the Stachytarpheta hildebrandtii of Vatke. Its correct name, therefore, is now Chascamum hildebrandtii (Vatke) Gillett, which see.

CHASCANUM ANGOLENSE Moldenke

Literature: Moldenke in Fedde, Repert. 45: 142—143. 1938; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 50 & 87. 1942; Moldenke, Alph. List Cit. 1: 243. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 49. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 118 & 178. 1949; Gillett, Kew Bull. 1955: 134. 1955; Moldenke, Résumé 146 & 145. 1959.

Gillett, in the reference cited above (1955), points out that this species appears to be very close in its characters to some forms of C. hildebrandtii (Vatke) Gillett and "future work may well show it to be conspecific."

CHASCANUM ARABICUM Moldenke

Literature: Moldenke in Fedde, Repert. 45: 138—140. 1938; Moldenke, Geogr. Distrib. Avicenn. 32. 1939; Moldenke, Revist. Sudam. Bot. 6: 16. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 53 & 87. 1942; Moldenke, Alph. List Cit. 1: 153 & 154. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 49. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 123, 124, & 178. 1949; Gillett, Kew Bull. 1955: 133. 1955; Moldenke, Résumé 134, 157, 158, & 145. 1959.

Gillett (1955) assumes from the color of the dried flowers on the type collection of this species that the corolla-limb is probably brownish-yellow or purplish rather than white or cream-colored when fresh. The limb is markedly darker than the tube in drying. He cites Glover & Gilliland 423, at Kew, from eastern Abyssinia. These collectors found the plant at an altitude of 600 meters, in open places, and describe it as a bushy plant, the corolla purple-brown with a yellow tube, blooming in November.

CHASCANUM CAESPITOSUM (H. H. W. Pearson) Moldenke

Additional & emended literature: Prain, Ind. Kew. Suppl. 3: 27. 1908; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87 (1942) and [ed. 2], 121 & 178. 1949; Moldenke, Alph. List Cit. 3: 902. 1949; Moldenke, Phytologia 4: 441. 1953; Moldenke, Résumé 152, 238, & 145. 1959.

CHASCANUM CERNUUM (L.) E. Mey.

Additional literature: Hook. & Jacks., Ind. Kew. 1: 327 & 507. 1893; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87. 1942; Moldenke, Alph. List Cit. 1: 29, 49, 50, 54, 112, 114, 165, 206, 220,

224, & 247 (1946), 2: 410, 415, 416, 435, 490, & 644 (1948), 3: 700, 707, 712, 754, 761, 813, 878, 887, 891, 902, 946, & 952 (1949), and 4: 997, 1012, 1038, 1069, 1139, & 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 4: 441. 1953; Moldenke, Résumé 152, 238—240, 251, & 445. 1959.

Leighton describes this plant as a perennial to 1 1/2 feet tall, with sweet-scented white flowers.

Additional citations: UNION OF SOUTH AFRICA: Cape of Good Hope: Leighton 1927 (N).

CHASCANUM DEHISCENS (L. f.) Moldenke

Additional & emended literature: Hook. & Jacks., Ind. Kew. 1: 327 & 507. 1893; Hill, Ind. Kew. Suppl. 6: 28. 1926; Moldenke in Fedde, Repert. 41: 62. 1936; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 31 & 36. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52, 71, & 87. 1942; Moldenke, Alph. List Cit. 1: 6, 34, 49, 50, 54, 78, 80, 117, 123, 164, 165, 174, 176, 204, 210, 219, 220, 234, 235, 276, & 277 (1946), 2: 354, 355, 358, 402, 408, 410, 415, 416, 430, 434, 448, 490, 561, 576, 620, 621, & 627 (1948), 3: 671, 675, 700, 754, 761, 808, 866, 885, 903, 907, & 917 (1949), and 4: 997, 1014, 1069, 1093, 1100, 1140, & 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121, 157, & 178. 1949; Moldenke, Phytologia 4: 441-442. 1953; Moldenke, Résumé 152, 214, 238, 240, 251, 277, 334, 335, 341, 342, & 445. 1959.

Meeuse, in a letter to me dated March 19, 1954, makes a strong case for the re-adoption of the binomial Chascanum cuneifolium for this species. He points out that the names Büchnera cuneifolia L. f. and Phryma dehiscens L. f. were both originally published in the same book. He maintains that it is the first combination in the genus Chascanum based on either of these names that must stand. He says that "Thunberg's name Buchnera cuneifolia appears first in Linn. f., Suppl. p. 288, with the addition 'Thunb.' It is pretty certain that many of the Cape plants described by Linn. f. in his Supplementum Plantarum were not only based on specimens contributed by Thunberg, but also already named by Thunberg (provisionally). This can for instance be concluded from the fact that in Thunberg's Nova Gen. Pl. I, also published in 1781, many names appear which are exactly the same as in the publication by Linnaeus the younger (see Falkia repens Thunb. in Nov. Gen. Pl. I and Falkia repens Linn. f. in Suppl. Pl., and there are many more similar examples). Thunberg, when quoting these names in his later works does not always mention Linn. f. as the author! As regards the priority of these publications, the one by Linnaeus is taken to be older, so that for instance the genus Falkia is attributed to Linn. f. and not to Thunberg. We can summarize as follows: (1) Linnaeus mentions Buchnera cuneifolia 'Thunb.' in his Suppl. Pl. (2) Thunberg, in his Prodr. Fl. Cap. (1800), p. 100, quotes Linnaeus and in the

Schultes edition of his *Flora Capensis*, referring to the same plant (and specimen) repeats the name as Buchnera cuneifolia, citing the older publications. (3) Meyer quotes B. cuneifolia Thunb., *Fl. Cap.* (1823) p. 466 — still the same plant, but quite naturally he quotes Thunberg as the author, but this citation includes all older synonyms! (4) Meyer's new combination is, therefore, valid and stands. It would make all the difference if the species attributed to Thunberg by the younger Linnaeus would be cited as 'Thunb. ex Linn. f.' or 'apud Linn. f.' but nobody has ever done so as far as I know. At any rate, strictly speaking this cannot be done under the Rules. According to Juel (*Pl. Thunbergianae*, 1918) Thunberg was the 'auctor intellectualis', so that ancient quotations mentioning him as the author are to be accepted, such as in the case of Buchnera cuneifolia. Accordingly, the correct name for the species under discussion is Chascanum cuneifolium (Linn. f.) E. Mey."

Additional citations: UNION OF SOUTH AFRICA: Cape of Good Hope: E. Wall 12, in part (Lu). Natal: M. Franks s.n. [J. M. Wood 11664] (Lu).

CHASCANUM GARIPENSE E. Mey.

Emended synonymy: Bouchea gariepensis Schau. ex Range in Fedde, *Repert.* 38: 256. 1935.

Additional & emended literature: Hook. & Jacks., *Ind. Kew.* 1: 327 & 507. 1893; Prain, *Ind. Kew. Suppl.* 3: 27. 1908; Range in Fedde, *Repert.* 38: 256. 1935; Hill, *Ind. Kew. Suppl.* 9: 61. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 31. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 52 & 87. 1942; Moldenke, *Alph. List Cit.* 1: 3, 15, 56, 74, 162, 165, 193, 215, 220, 261, 270, & 277 (1946), 2: 415—417, 620, & 644 (1948), 3: 663, 707, 732, 780, 802, 816, 825, 841, 866, 898, 900, 902, 903, & 968 (1949), and 4: 1010, 1030, 1068, 1135, & 1147. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 121 & 178. 1949; Moldenke, *Phytologia* 4: 443. 1953; Moldenke, *Résumé* 151, 152, 238, 251, & 445. 1959.

Range (1935) cites his numbers 118, 514, 534, 1061, and 2538, not as yet seen by me.

Additional citations: SOUTHWEST AFRICA: Bass s.n. [Herb. Transvaal Mus. 36201] (Z); Seydel 36 (B), 453 (B). UNION OF SOUTH AFRICA: Cape of Good Hope: H. H. W. Pearson s.n. [X.1905] (Lu); F. R. R. Schlechter 11410 (B); Wasserfall 1030 (Z).

CHASCANUM GILLETII Moldenke

Additional & emended literature: Moldenke, *Geogr. Distrib. Avicenn.* 30. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 45 & 87. 1942; Moldenke, *Alph. List Cit.* 1: 235. 1946; E. J. Salisb., *Ind. Kew. Suppl.* 10: 49. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 110 & 178. 1949; Gillett, *Kew Bull.* 1955: 133—134. 1955; Moldenke, *Résumé* 135, 145, & 445. 1959.

Gillett (1955) records the following additions to the diagno-

sis: fruiting-calyx slightly inflated, split to the base, 7 mm. long; mericarps glabrous, stramineous, oblong, 4 mm. long, 1 mm. wide, reticulate-sculptured at the apex, distantly longitudinally striate toward the base.

The type collection was made on a stony limestone hill with Acacia bussei woodland, near Buramo, at 10°5' N., 43°10' E. The flowers are reported by collectors as apricot-colored or reddish-brown, the corolla-limb brownish-yellow, the tube cream-colored. Gillett states "It seems that the corolla-limb is consistently dark yellow brown or purplish resembling that of C. arabicum and different (so far as is known) from that of all other species in N. E. Africa." It appears to inhabit rocky ground and has been collected in anthesis in February, May, August, and September, and in fruit in February. The Kenya collection, cited below, was made in cracks in granite rocks in Acacia-Commiphora scrub, at 3400 feet altitude; the corolla-limb said to be yellow, with the tube cream-colored.

The Lort Philips specimens cited below were originally cited by me in Revist. Sudam. Bot. 6: 16 (1939) as C. adenostachyum (Schau.) Moldenke in error. As Gillett has pointed out, they lack the characteristic glandular hairs in the inflorescence possessed by the latter species which is limited to southern Africa.

Gillett cites in addition from British Somaliland Gillett 4934 (K--isotype), M. White 132 (K), Bally 7272 (K), and Collenette 99 (K), and from Kenya Gillett 13196 (K), not yet seen by me.

Additional citations: BRITISH SOMALILAND: Lort Phillips s.n. [Wagga Mts., 1897] (Bm), s.n. [Rugger Pass] (Bm); Thomson 41 (K), 46 (K). KENYA: Gillett 13196 (S).

CHASCANUM GÜRKEANUM (Loes.) Moldenke

Synonymy: Bouchea gürkeana Loes. ex Dinter in Fedde, Repert. 15: 352, hyponym. 1918. Bouchea guerkeana Loes. ex Range in Fedde, Repert. 38: 256. 1935. Chascanum gurkeanum Hauman ex Moldenke, Résumé Suppl. 1: 16, in syn. 1959.

Literature: Dinter in Fedde, Repert. 15: 352. 1918; Range in Fedde, Repert. 38: 256. 1935; Moldenke, Phytologia 4: 443-444. 1953; Hauman, Assoc. Etud. Tax. Fl. Afr. Trop. Index. 1954; Moldenke, Résumé 151 & 445. 1959.

The species is based on Dinter 390, collected in 1917 on Farm Judaea at Hoachanas, Namaland, Southwest Africa. Apparently no description has as yet been published, and the type collection has not as yet been made available to me for examination.

CHASCANUM HANNINGTONII (Oliv.) Moldenke

Additional & emended literature: Hook. & Jacks., Ind. Kew. 1: 327. 1893; J. G. Baker in Thistelton-Dyer, Fl. Trop. Afr. 5: 283. 1900; Moldenke, Torreya 34: 9. 1934; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 30. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 49 & 87. 1942; Moldenke, Alph. List Cit. 1: 255. 1946; Moldenke, Known Geogr. Distrib.

Verbenac., [ed. 2], 116 & 178. 1949; Gillett, Kew Bull. 1955: 135. 1955; Moldenke, Résumé 143, 238, & 445. 1959.

Illustrations: Oliv. in Hook., Icon. Pl. 15: pl. 1446. 1883.

Gillett (1955) maintains that this species belongs in the subgenus Rhagocarpium next to C. hildebrandtii (Vatke) Gillett, rather than in Euchascanum, where I originally placed it. He notes that bracteoles are absent and the only cocci visible in the solitary specimen known are too young to enable us to decide whether they separate spontaneously when ripe or not. He states that the type was probably collected in the area between 36°25' and 37°35' E. and 6°15' to 20' S. in 1882 or 1883.

CHASCANUM HEDERACEUM (Sond.) Moldenke

Additional & emended literature: Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87. 1942; Moldenke, Alph. List Cit. 1: 4, 49, 50, 80, 102, 114, 130, 219, 220, 235, & 277. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 33. 1947; Moldenke, Alph. List Cit. 2: 554, 556, 557, 598, & 645 (1948), 3: 659, 706, 721, 740, 761--763, 803, 825, 847, 849, 858, 866, 902, 946, 949, & 976 (1949), and 4: 981, 985, 993, 994, 1004, 1093, 1135, & 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 119, 121, & 178. 1949; Moldenke, Phytologia 4: 444. 1953; Moldenke, Résumé 148, 152, 238, 239, & 445. 1959.

This species is described by collectors as a subshrub, semi-upright and to 6 dm. tall, or decumbent, inhabiting the bushveld, roadsides on red sandy loam, red sandy soil on the south side of quartzite ridges, and thorn scrub on red magnetite loam, in fruit in April. Sidney describes the flowers as "tubular". They are said by Meeuse to be pale cream-colored.

Additional citations: UNION OF SOUTH AFRICA: Transvaal: L. E. Codd 1118 (Ss), 2556 (Ss); Leemann s.n. [Herb. Transvaal Mus. 27474] (Z); R. Leendertz 2311 (N); Meeuse 9097 (Cb), 9464 (Ss); F. R. R. Schlechter 3707 (Cb); Sidney 1386 (S); Van Dam s.n. [Herb. Transvaal Mus. 25675] (Cb).

CHASCANUM HEDERACEUM var. NATALENSE (H. H. W. Pearson) Moldenke

Additional & emended literature: Thiselton-Dyer, Ind. Kew. Suppl. 2: 28. 1904; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 51, 52, & 87. 1942; Moldenke, Alph. List Cit. 1: 50, 51, & 234 (1946) and 2: 614. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 89. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 119--121 & 178. 1949; Moldenke, Alph. List Cit. 3: 761, 762, 866, & 902 (1949) and 4: 983, 1135, & 1140. 1949; Moldenke, Phytologia 4: 444--445. 1953; Moldenke, Résumé 148, 150, 152, 238, 239, 261, 277, & 446. 1959.

CHASCANUM HILDEBRANDTII (Vatke) Gillett, Kew Bull. 1955: 134--135. 1955.

Synonymy: Stachytarpheta hildebrandtii Catke, Linnaea 43:

529. 1882. Chascanum africanum Moldenke in Fedde, Repert. 45: 136--138. 1938.

Literature: Vatke, Linnaea 43: 529. 1882; Hook. & Jacks., Ind. Kew. 2: 974. 1895; J. G. Baker in Thiselton-Dyer, Fl. Trop. Afr. 5: 284. 1900; Moldenke in Fedde, Repert. 45: 136--138. 1938; Moldenke, Revist. Sudam. Bot. 6: 16. 1939; Moldenke, Geogr. Distrib. Avicenn. 30. 1939; Hutchinson & Bruce in Gillett, Kew Bull. 1941: 176. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45, 49, 50, 87, & 100. 1942; Moldenke, Alph. List Cit. 1: 28, 98, 112, 224, 247, & 250. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 49. 1947; Moldenke, Alph. List Cit. 2: 537. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 64. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 110, 116--118, 178, & 196. 1949; Moldenke, Alph. List Cit. 3: 784 (1949) and 4: 995. 1949; Moldenke, Phytologia 4: 441. 1953; Gillett, Kew Bull. 1955: 134--135. 1955; Assoc. Etud. Tax. Fl. Afr. Trop. Index 1955: 63. 1956; Moldenke, Résumé 143, 145, 250, 348, & 446. 1959.

A much-branched perennial herb, according to Vatke's original description, with terete pilose stems; leaves decussate-opposite, oblong, 2.5--4 cm. long, distinctly petiolate, obtuse at the apex, crenate along the margins, cuneate at the base, hairy on both surfaces; spikes 15--23 cm. long, the rachis slender, hairy, tetragonal, not hollowed out opposite the flowers; bracts lanceolate, the lower ones about 6 mm. long; calyx about 12 mm. long, 4-ribbed, pilose, the teeth minute; corolla-tube about twice as long as the calyx, its limb milky-white, about 6 mm. wide.

Greenway describes the plant as a much-branched annual herb, up to 2 feet tall, with white or pink flowers, common as a weed among grasses on a pale-red soil in a sisal plantation, altitude 1200 feet, flowering in July. Verdcourt calls it a branched herb 1 foot tall, with white flowers, the corolla-tube very much curved and the anthers yellowish, growing with Indigofera, Aristida, Cenchrus, Acacia albida, and Spirocarpa in grassland, altitude 4500 feet, flowering and fruiting in October. Specimens have been misidentified and distributed in herbaria as Bouchea pterygocarpa Schau. and Svensonia pterygocarpa (Schau.) Moldenke.

The type of the species was collected by Johann Maria Hildebrandt (no. 2737) -- in whose honor it is named -- in the central province of Kenya, and is deposited in the herbarium of the Botanisches Museum at Berlin. The type of C. africanum was collected by Helen Maria Gardner (no. 3372) at Kiteta, Machakos district, Kenya, at an altitude of 3500 feet, in January, 1935, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. When I proposed the latter name I had seen a specimen of Hildebrandt's collection, but was not aware of its being the type of Stachytarpheta hildebrandtii. Gillett (1955) has pointed this out and his new combination must be adopted. He remarks that "There is no doubt that this plant is a Chascanum. Vatke does not mention the number of stamens (2 in Stachytarpheta, 4 in Chascanum): There are 4 in the Kew sheet of Hildebrandt 2737

and in all other specimens examined. Vatke, followed by Baker, states that the calyx of S. hildebrandtii is 4-ribbed and 4-toothed. Examinations of Hildebrandt 2737 and other specimens show it to be 5-ribbed and 5-toothed...."

The species was reported from British Somaliland by me in several previous publications and by Hutchinson & Bruce in their 1941 publication cited above. However, as Gillett has pointed out, "of the specimens cited, Thomson 41, 46 and Gillett 4934 are C. gillettii, Gillett 4550 is Svensonia laeta and 4518 is C. sessilifolium. True C. hildebrandtii has, so far, not been seen from further north than Dandu (3°26' N.) in N. Kenya (Gillett 13053, 13230). There is great variation in the apex of the mericarp in C. hildebrandtii. In some specimens, e.g. Kirrika 75, this is definitely truncate, in others, e.g. Bally 498, Verdcourt 759, it is pointed and a small wing is formed; yet others are intermediate. These differences do not seem to be correlated with other characters. The wing, if present, is much smaller than in Svensonia laeta and the differences in indumentum readily distinguish the two species, but these forms of C. hildebrandtii with rudimentary wings, together with the relatively short wing in Svensonia moldenkei certainly cast some doubt on the generic status of Svensonia. Chascanum angolense Moldenke, at present known only from a single gathering, is extremely close to some forms of C. hildebrandtii and future work may well show it to be conspecific!"

Drummond & Hemsley describe the plant as an annual to 80 cm. tall, with a green calyx and white corolla, growing along roadsides and the margins of cultivation. Peter found it flowering and fruiting in May and June at altitudes of 500 to 925 meters, and confused it with Bouchea marrubiifolia Schau. and the genus Hebenstreitia in the Selaginaceae. Hutchinson & Bruce record the common name "ubololu", but it is not certain if this name applies here or to C. gillettii, C. sessilifolium, or Svensonia laeta.

Additional & corrected citations: UGANDA: Paget-Wilkes K.A. 0131 (Bm, N); Verdcourt 759 (Af). TANGANYIKA: Drummond & Hemsley 2338 (S); P. J. Greenway 4013 (Af); J. W. Gregory s.n. [Camp 103] (Bm); Haarer 523 (K, N); A. Peter 10369 [OIII.104] (B), 10471 [OIII.105] (B), 10483 [OIII.106] (B), 10593 [OIII.108] (B), 11008 [OIII.115] (B), 13493 [OIII.178] (B), 40914 [V.255] (B), 41261 [V.261] (B), 41602 [V.266] (B). KENYA: Baltiscombe 259 (K); Champion T.441 (K); Cockburn s.n. [s. of Lake Rudolf] (K); H. M. Gardner 3372 (K, K, K—photo, Z—photo); Hildebrandt 2737 (Bm—isotype, P—isotype).

CHASCANUM HUMBERTI Moldenke, Phytologia 3: 262. 1950.

Additional literature: Moldenke, Phytologia 4: 445. 1953; E. J. Salisb., Ind. Kew. Suppl. 11: 51. 1953; Moldenke in Humbert, Fl. Madag. 174: 19--20. 1956; Moldenke, Résumé 155 & 446. 1959.

Small shrub or subshrub, about 1 m. tall; branches and

branchlets very slender, rather acutely tetragonal, light-gray, very densely cinereous- or albidous-puberulent with retrorse hairs, more or less striate-costate; nodes annulate; principal internodes 0.5--4.5 cm. long; leaves decussate-opposite, often with extremely abbreviated twigs in their axils; petioles very slender, 5--10 mm. long, canaliculate above, densely cinereous-puberulent; leaf-blades chartaceous in drying, probably more or less fleshy when fresh, elongate-oblong, 1--4 cm. long, 3--12 mm. wide, obtuse or subacute at the apex, long-attenuate at the base, very sparsely and obscurely strigillose, soon glabrescent on both surfaces; midrib slender, plane above, somewhat prominulous beneath and rather densely puberulent; secondaries and veinlet reticulation indiscernible on both surfaces; inflorescence terminal, spicate, 11--15 cm. long, rather loosely many-flowered; peduncles very slender, light-gray, 1.5--2.5 cm. long, very densely cinereous-puberulent; rachis similar to the peduncles in all respects but somewhat flexuous and less densely puberulent, not excavated; bractlets lanceolate, 4--5 mm. long, long-attenuate at the apex, lightly and minutely puberulent or glabrescent; calyx tubular, 11--12 mm. long, about 1 mm. wide, minutely puberulent or glabrescent, 5-ribbed, its rim very shortly 5-toothed, the teeth apiculate; corolla hypocrateriform, varying from rose or pale-rose to violet or slightly rosy-white, showy, long-exserted, its tube narrow-cylindric, about 3 cm. long, subglabrous on the outer surface or more or less scattered-pilose near the apex and short-pubescent at the mouth, its limb wide-spreading, deeply 5-parted, the lobes obovate, about 7 mm. long and 5--7 mm. wide, rounded or sinuate at the apex; stamens 4, didynamous, inserted near the apex of the corolla-tube, included; filaments extremely short; pistil included; fruit not seen.

The type of this handsome species was collected by Henri Humbert (no. 11548) -- in whose honor it is named -- in forests and bush on limestone soil at an altitude of 50--200 m., in the low valley of Fiherenana, Madagascar, in November, 1933, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris. The species is said to grow on limestone hills and in rocky places and ravines, in tropophilous forests and xerophilous bush, at altitudes of 10 to 300 meters, and has been collected in anthesis in January, April, August, September, and November.

CHASCANUM INCISUM (H. H. W. Pearson) Moldenke

Additional & emended literature: Prain, Ind. Kew. Suppl. 3: 27. 1908; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87. 1942; Moldenke, Alph. List Cit. 1: 31, 57, 130, & 219 (1946), 3: 762, 763, 866, & 902 (1949), and 4: 994. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 4: 445. 1953; Moldenke, Résumé 152, 238, & 446. 1959.

Meeuse describes this plant as a much-branched low subshrub or small, dense, somewhat spreading perennial suffrutescent at base.

ENVIRONMENT AND TRICHOME MORPHOGENESIS IN NICOTIANA

Brown, H. D., Cherrie, A., and Cassens, A.

Trichomes of *Nicotiana* have been elaborately studied (reviewed by Goodspeed, 1954) but employment of their descriptions as taxonomic aids has largely been frustrated by environmentally induced variation. Hence, it became the view of the authors that these structures would be suitable objects for a study of the roles of environmental factors in morphogenesis.

Temperature, pressure, light, and, principally, mineral nutrients were experimentally varied.

MATERIALS AND METHODS

Seeds were germinated upon filter paper moistened and placed within petri dishes. Though not pretreated, the seeds were covered by a second moist filter-paper sheet for three days. Percentage of germination was high for all varieties (70 to 80 percent). Experimental treatment followed transfer to washed-sand culture.

"Flowering tobacco" seeds were obtained from several commercial houses and represented horticultural varieties within the subgenera *Tabacum* and *Petunioides*. The suppliers identified the forms as Day-light, Sensation, Evening Star, *Nicotiana alata*, Crimson Bedder and Affinis.

The seedlings were transferred from filter paper to vessels containing washed sand and the appropriate nutrient medium. Control fluid was Pfeiffer's solution (Miller, 1938). Fluid level was maintained at saturation by constant drip or, in some procedures, by periodic addition.

Every two to four days representative seedlings were removed from the culture, whole-mounted, and studied microscopically. The trichomes of the cotyledons were observed without staining, *in vivo*. Photographs and camera-lucida drawings supplemented other notation.

Temperature-varied plants were grown at 20°C and 41°C with controls at room temperature. All were bathed by Pfeiffer's nutrient solution. These plants were exposed to incandescent illumination constantly.

Pressure-varied plants were kept at 20 lbs./sq. in. in a metal container with a controlled eight-hour light period each day. Pressure was maintained by filtered air from the laboratory line. The temperature in the vessel was 38°C.

Nutrient-varied plants received Pfeiffer's solution lacking, respectively, manganese (manganese chloride), zinc (zinc chloride), boron (boric acid), and copper (copper chloride). Controls received the complete medium. The plants were grown within a glass-enclosed case

and received light from two sixty-watt incandescent bulbs at a distance of ^c1 foot for eight hours each day. Additional extraneous room light reached the plants. The average light-period temperature was 34°C; 4-8°C less during other hours.

To avoid the variation incident upon trace contamination, a single chemical supply was used and the number of nutrient solutions was limited to two.

Seedlings were also grown in garden loam and trichome development was compared with that in Pfeiffer's-medium control plants. Observations continued, in every instance, for about 40 days.

OBSERVATIONS

Trichomes developed identically on cotyledons of soil-grown and Pfeiffer's-medium sand-culture grown plants. Though from variety to variety growth patterns varied with regard to a time preference, regularity within the members of a variety was of a high order under the conditions of this study.

The developmental pattern characteristic of *Affinis* is represented by Figures 1-5. Other varieties were similar though maturation periods varied from 43 days in Evening Star to 23 days in Daylight.

Under the conditions of temperature, pressure, and light variation, of this investigation, no significant effect upon development of trichomes was noted.

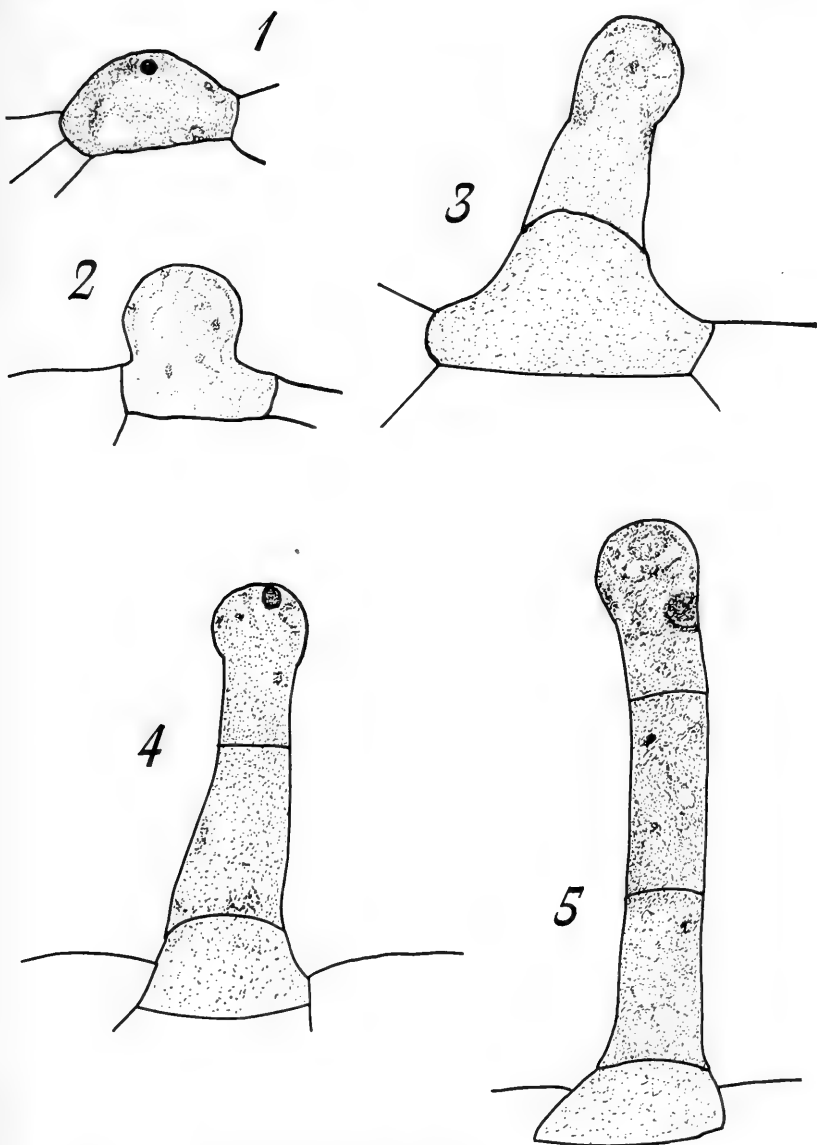
Deprivation of trace elements was reflected in trichome development. Boron deficiency, perhaps stimulatory in early development resulted in a reduction in the number of mature hairs. Copper-deprived plants matured in smaller numbers and there was frequently a modification of the normally knob-like tip to a more or less pointed apex. Manganese-deficient plants were slightly inhibited. (Only the Evening-Star variety was grown with boron, copper, and manganese deficiencies.)

TABLE I. Trichome development in control and zinc-deprived plants, of the variety *Affinis*, 23 days after germination. ¹

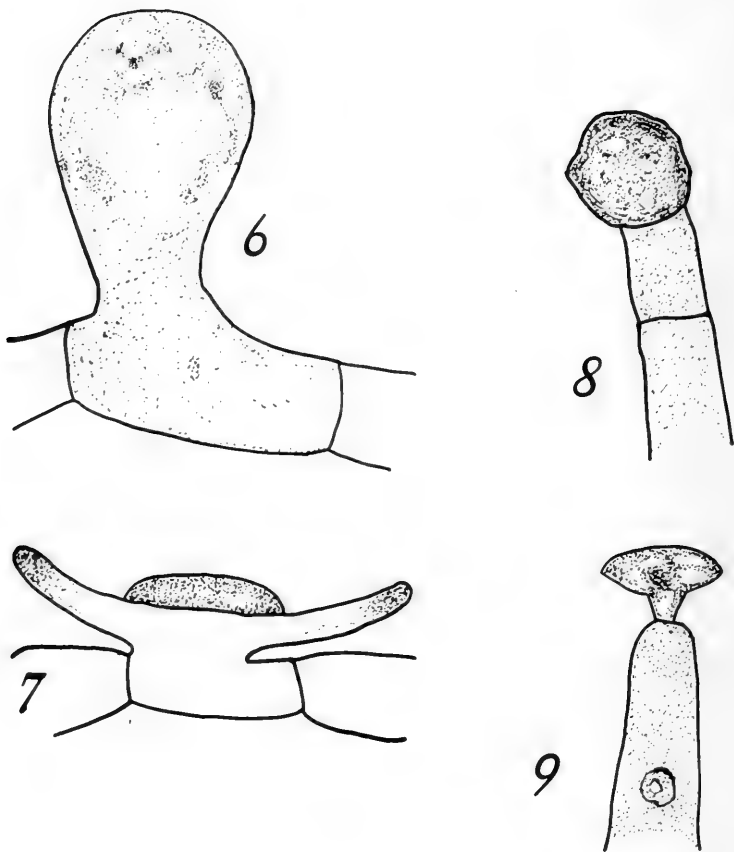
1 cell trichomes		2 cell		3 cell		4 cell		aberrant		total	
+ zinc	-	+	-	+	-	+	-	+	-	+	-
6.4	4.4	29.6	19.4	2.8	4.2	.2	.8	.8	2.6	39.8	31.4
16.1%	14.0%	74.4%	61.8%	7.0%	13.4%	.5%	2.5%	2.0%	8.3%	-	-

¹ Average per seedling along cotyledon edges.

Zinc deprivation markedly affected the development of the trichomes. Table I is a comparison of control and zinc-deprived plants in *Affinis* at 23 days after germination. The average total number of trichomes per leaf (edges of leaf only) is 39.8 in control plants and 31.4 in zinc-deprived plants.



FIGURES 1-5. Normal developmental pattern of cotyledon trichomes in *Affinis*. Figures 1 and 2. Earlier and later one-cell stages. Figure 3. Two-cell stage. Figure 4. Three-cell stage. Figure 5. Four-cell stage.



FIGURES 6-9. Aberrant trichomes. Figure 6. Giant one-cell hair (*Affinis*). Figure 7. Peltate-like structure (*Evening Star*). Figures 8 and 9. Degenerating apical cells; earlier and later (*Affinis*).

In all varieties, the most striking result of zinc deprivation is the production of monsters, degenerative, and variously aberrant forms. Evening Star showed the most extreme variation, developing lateral extensions of the basal cell and flattening of distal cells to yield a scale-like structure (Figure 7). Though such apparent mimicries were not observed in other varieties, a wide range of aberrant forms was observed in all types. Some of these are illustrated in Figures 6, 8, and 9.

DISCUSSION

The possibility exists that the morphological effects of zinc deprivation may not necessarily indicate a unique activity in hair cells as apart from other of the plant tissues. That is, these structures may be capable, presumably by virtue of their relative physical independence as compared with totally surrounded tissue cells, of structurally reflecting a general physiologic pattern. The trichomes are, in any event, a sensitive indicator.

Development of abnormal epidermal hairs, in one variety resulting in the appearance of peltate structures (not frequently found on the cotyledons) and in all varieties in the emergence of widely aberrant forms, indicates strongly that zinc is related to the normal morphogenesis of these structures. The peltate-like development of hairs under zinc deprivation is suggestive that this may be a factor in the mechanism by which normal peltate hairs have evolutionarily appeared. (Peltate hairs do, of course, commonly appendage mature *Nicotiana* leaves.)

What the relationship between morphogenesis of these structures and zinc may be is conjectural beyond the obvious likelihood that the effects observed are intimate with the function of a zinc-metalloenzyme system. Seven such systems are biologically known (Vallee, 1959) and it seems not unlikely that others may exist.

More directly, several workers have related zinc to indole acetic acid. Tsui (1948) reported, that in tomato, zinc may function enzymatically, in the synthesis of auxin. Skoog (1940) believes that zinc is not directly involved in the synthesis of auxin but rather functions to prevent its oxidative destruction.

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ADDITIONAL NOTES ON THE GENUS CASTELIA. I

Harold N. Moldenke

These notes are supplementary to my monograph of the genus as published in Phytologia 6: 232-241 (1958).

CASTELIA Cav.

Additional synonymy: Bastelia Cav. ex Moldenke, Alph. List Cit. 4: 1088, sphalm. 1949.

Additional & emended literature: Walp., Repert. Bot. Syst. 4: 33 & 36. 1845; Hook. & Jacks., Ind. Kew. 2: 493 (1894) and 2: 1179. 1895; Sanzin, Anal. Soc. Cient. Argent. 88: 106, fig. 10. 1919; Moldenke in Fedde, Repert. 41: 10 & 62. 1936; Moldenke, Alph. List Cit. 1: 170, 230, 272, & 304 (1946), 2: 337, 338, 355, 358, 371-373, 377, 379, 381, 407, 423-426, 430, 434, 435, 438-442, 500, 537, 561, 565-567, 575, 580, 584, 593, 598-600, 613, 617, & 626-628 (1948), 3: 662, 663, 672, 673, 703, 728, 731, 732, 735-737, 746, 767, 784, 812, 838, 848, 859, 864, 865, 880, 884, 893, 900, 903, 911, 913, 931, & 940 (1949), and 4: 979, 980, 983, 1010, 1013, 1036, 1043, 1044, 1049, 1050, 1056, 1062, 1070, 1075, 1078, 1088, 1090, 1091, 1115, 1120, 1138, 1187, 1192, & 1302. 1949; Moldenke, Résumé 82, 87, 113, 120, 123, 214, 238, 249, 250, 333, 335, 340, 369, 371, 377, 407, 423, & 445. 1959; Moldenke, Résumé Suppl. 2: 8 & 12. 1960.

CASTELIA CUNEATO-OVATA CAV.

Additional synonymy: Verbena lobelioides Grah. ex Walp., Repert. Bot. Syst. 4: 33, in syn. 1845. Verbena orchiioides Hort. ex Hook. & Jacks., Ind. Kew. 2: 1179. 1895. Bastelia cuneato-ovata Cav. ex Moldenke, Alph. List Cit. 4: 1088, sphalm. 1949.

Emended illustrations: Sanzin, Anal. Soc. Cient. Argent. 88: 106, fig. 10. 1919.

Additional citations: CHILE: Coquimbo: Philippi 933 (B). ARGENTINA: Catamarca: J. Brizuela s.n. [22-IV-1950] (Vi). Córdoba: Lossen 3 (Um--101); Sparre 1474 (S). Mendoza: Villafañe 899 (OK), 933 (Vi). Salta: Zabala 131 [Herb. Inst. Miguel Lillo 38044] (Vi). San Luis: Terribile 752 (Ur). Santiago del Estero: Gramajo s.n. [Herb. Inst. Miguel Lillo 98621] (W--1950856).

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A NEW HAWAIIAN VARIETY OF CAPPARIS

Otto & Isa Degener

Thanks to a grant from the National Science Foundation, the writers were able to botanize on the Island of Kauai, Hawaiian Archipelago. The precipitous northwest shore about Polihale, Kauai, is arid and, due to the ravages of feral goats and the competition with exotic weeds such as Leucaena glauca (L.) Benth. and Pluchea odorata (L.) Cass., almost devoid of native plants. Among the few surviving are, on the talus slopes, species of shrubby Chamaesyce and Myoporum, and, along the boulder-strewn shore, an undescribed variety of Capparis sandwichiana DC. This last is here named in honor of Prof. M. Zohary, monographer of the species and varieties of Capparis occurring in the Mediterranean and Near Eastern countries:

CAPPARIS SANDWICHIANA var. ZOHARYI Degener & Degener, var. nov.
ab specie principaliter differt plusminus pubescente.

Stems, petioles, under side of the leaf blades and flower buds white-tomentulose when young but glabrate with age. Leaves with the blade up to 77 mm. long and 55 mm. wide and with subcordate to subtruncate base.

Known from about a dozen plants growing in and about the type locality along "Rocky shore subject to ocean spray during storms. Polihale, Kauai." Otto & Isa Degener 27,254, November 22, 1960. Because of the variety's interest, the writers returned on November 27 to the same general locality to collect a good series of specimens (No. 27,256).

- - - - -

ADDITIONAL NOTES ON THE GENUS CHASCANUM. IV

Harold N. Moldenke

CHASCANUM INCISUM (H. H. W. Pearson) Moldenke

Meeuse reports that this plant is much-branched at the base, while Codd says that it is a 6-inch shrublet. It has been collected in very sandy mixed bushveld, with stems ascending to erect, in sandy dry Acacia thornveld, and on limestone formations at 2000 feet altitude. The flowers are described as white, pale-yellow, or mauve, blooming in March.

Additional citations: UNION OF SOUTH AFRICA: Transvaal: L. E. Codd 3932 (Ss); Leendertz s.n. [I.09] (Z); Meeuse 9473 (Ss), 9499 (Ss), 9506 (Ss); F. A. Rogers 20852 (Cb).

CHASCANUM INCISUM var. *CANESCENS* Moldenke

Literature: Moldenke in Fedde, Repert. 45: 309. 1938; Moldenke, Revist. Sudam. Bot. 6: 20. 1939; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87. 1942; Moldenke, Alph. List Cit. 1: 162. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Résumé 151 & 446. 1959.

The variety has been collected in fruit in April.

Additional citations: SOUTHWEST AFRICA: Dinter 6249 (B—iso-type), 6764 (B).

CHASCANUM INSULARE Moldenke

Additional and emended literature: Moldenke, Geogr. Distrib. Avicenn. 32. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 53 & 87. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 49. 1947; Moldenke, Alph. List Cit. 3: 877. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 123 & 178. 1949; Moldenke, Phytologia 4: 445. 1953; Moldenke in Humbert, Fl. Madag. 174: 17—19, fig. II, 4 & 5. 1956; Moldenke, Résumé 155 & 446. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: fig. II, 4 & 5. 1956.

CHASCANUM INSULARE var. *CANESCENS* Moldenke, Phytologia 3: 263. 1950.

Additional literature: Moldenke in Humbert, Fl. Madag. 174: 19. 1956; Moldenke, Résumé 155 & 446. 1959.

This variety differs from the typical form of the species in being very densely canescent on the branches, stems, twigs, petioles, rachis, bractlets, calyxes, and leaves.

The type of the variety was collected by Henri Humbert (no. 19952) on calcareous rocky ground in xerophilous bush in the neighborhood of Tulear, near the hill of La Table, at an altitude of 150 meters, Madagascar, on January 21, 1947, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris. It has been collected in anthesis in January.

CHASCANUM INSULARE var. *HUMBERTI* Moldenke, Phytologia 3: 263. 1950.

Additional literature: Moldenke, Phytologia 4: 446. 1953; Moldenke in Humbert, Fl. Madag. 174: 19, fig. II, 6 & 7. 1956; Moldenke, Résumé 155 & 446. 1959.

Illustrations: Moldenke in Humbert, Fl. Madag. 174: fig. II, 6 & 7. 1956.

This variety differs from the typical form of the species in having many of its larger mature leaves more or less irregularly dentate toward the apex.

The type of the variety was collected by Henri Humbert (no. 13290) on gneiss rock at Mont Morahariva (Mahamena), in the valley of the Manambolo, on the right bank (basin of Mandrare), in the vicinity of Isomono, Madagascar, at an altitude of 1000—1400 m., in December, 1933, and is deposited in the herbarium of the Muséum

National d'Histoire Naturelle at Paris.

CHASCANUM INSULARE var. **TRIANGULARE** Moldenke, *Phytologia* 3: 263. 1950.

Additional literature: Moldenke, *Phytologia* 4: 446. 1953; Moldenke in Humbert, *Fl. Madag.* 174: 19. 1956; Moldenke, *Résumé* 155 & 446. 1959.

This variety differs from the typical form of the species in having its bractlets triangular in shape, 1.5–2 mm. long, and acute or only very slightly subacuminate at the apex.

The type of the variety was collected by Henri Humbert and Charles Fletcher Swingle (no. 5493) on a calcareous plateau toward the east of the delta in the basin of Linta, at an altitude of 200–250 m., Madagascar, on August 29, 1928, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris.

CHASCANUM INTEGRIFOLIUM (H. H. W. Pearson) Moldenke

Additional and emended literature: Prain, *Ind. Kew. Suppl.* 3: 27. 1908; Hill, *Ind. Kew. Suppl.* 9: 61. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 31. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 52 & 87 (1942) and [ed. 2], 121 & 178. 1949; Moldenke, *Alph. List Cit.* 3: 770. 1949; Moldenke, *Phytologia* 4: 446. 1953; Moldenke, *Résumé* 152, 238, & 446. 1959.

CHASCANUM KROOKII (Gürke) Moldenke

Additional and emended literature: Prain, *Ind. Kew. Suppl.* 3: 27. 1908; Hill, *Ind. Kew. Suppl.* 9: 61. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 31. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 52 & 87. 1942; Moldenke, *Alph. List Cit.* 1: 248 (1946) and 2: 621. 1948; H. N. & A. L. Moldenke, *Pl. Life* 2: 67. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 121 & 178. 1949; Moldenke, *Alph. List Cit.* 3: 761, 808, 895, & 902 (1949) and 4: 1140. 1949; Moldenke, *Phytologia* 4: 446. 1953; Moldenke, *Résumé* 152, 238, & 446. 1959.

CHASCANUM LATIFOLIUM (Harv.) Moldenke

Additional and emended literature: Jacks., *Ind. Kew.* 1: 327. 1893; Hill, *Ind. Kew. Suppl.* 9: 61. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 31. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 52 & 87. 1942; Moldenke, *Alph. List Cit.* 1: 234 (1946), 3: 700, 761, 762, & 895 (1949), and 4: 993 & 1140. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 121 & 178. 1949; Moldenke, *Phytologia* 4: 446–447. 1953; Moldenke, *Résumé* 152, 238, & 446. 1959.

CHASCANUM LATIFOLIUM var. **GLABRESCENS** (H. H. W. Pearson) Moldenke

Additional and emended literature: Moldenke, *Geogr. Distrib. Avicenn.* 31. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 52 & 87. 1942; Moldenke, *Alph. List Cit.* 1: 15, 50, & 219 (1946), 2: 556 & 631 (1948), 3: 659 (1949), and 4: 993. 1949;

Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 1: 447. 1953; Moldenke, Résumé 152, 238, & 446. 1959.

Additional citations: UNION (F SOUTH AFRICA: Transvaal: J. Collins s.n. [X.1913] (Cb); F. J. Rogers 18319 [Herb. Transvaal Mus. 14868] (Z).

CHASCANUM LATIFOLIUM var. TRANSVAALENSE Moldenke

Literature: H. H. W. Pearson in Thiselton-Dyer, Fl. Cap. 5 (1): 203. 1901; Moldenke in Fedde, Repert. 45: 303. 1938; Moldenke, Revist. Sudam. Bot. 6: 20. 1939; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87. 1942; Moldenke, Alph. List Cit. 1: 49, 80, & 220 (1946), 2: 581 (1948), 3: 761, 762, & 866 (1949), and 4: 996. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Résumé 152 & 446. 1959.

Sidney describes this as a bushy plant with numerous stems, spreading, 1--1 1/2 feet tall, with white to mauve flowers, growing in the grassveld, blooming in August. Codd found it in mountain grassveld.

Additional citations: UNION OF SOUTH AFRICA: Transvaal: L. E. Codd 574 (Z); Sidney 1504 (S, S).

CHASCANUM LIGNOSUM (Dinter) Moldenke

Additional and emended literature: Hill, Ind. Kew. Suppl. 7: 31. 1933; E. J. Salisb., Ind. Kew. Suppl. 10: 49. 1947; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 87. 1942; Moldenke, Alph. List Cit. 1: 162 (1946) and 3: 802. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 4: 447. 1953; Moldenke, Résumé 151, 152, 238, 239, & 446. 1959.

Additional citations: SOUTHWEST AFRICA: Dinter 5120 (B--isotype).

CHASCANUM MARRUBIIFOLIUM Fenzl

Additional synonymy: Bouchea marrubiifolia Schau. apud Monod, Bull. Inst. Franc. Afr. Noir 14: 433. 1952. Bouchea marrubiifolia (Fenzl ex Walp.) Schau. apud Gillett, Kew Bull. 1955: 133, in syn. 1955.

Additional and emended literature: Chiov., Fl. Somalia [1]: 274. 1929; Xavier Lavis & Monod, Bull. Agenc. Gén. Colon. 27: 605. 1934; Moldenke, Geogr. Distrib. Avicenn. 29--32 & 36. 1939; Monod, Publ. Com. Ét. Hist. & Soc. Afr. Occid. Franç., sér. B, 5: pl. 21. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45, 48, 50, 53, 54, 71, & 88. 1942; Moldenke, Alph. List Cit. 1: 9, 27, 40, 71, 74, 101, 104, 115, 122, 128, 131, 141, 153, 156, 183, 190, 267, & 275. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 49. 1947; Moldenke, Alph. List Cit. 2: 352, 430, 537, 550, 558, 559, 577, 601, 619, & 626 (1948), 3: 672, 684, 685, 712, 761, 776, 783, 811, 812, 822, 832, 891, 916, 945, 969, & 976 (1949), and 4: 1010, 1094, & 1147. 1949; Moldenke, Known Geogr. Distrib. Verbenac.,

[ed. 2], 109, 110, 114, 117, 123, 124, 157, & 178. 1949; Monod, Bull. Inst. Franç. Afr. Noir 14: 433. 1952; Moldenke, Phytologia 4: 447--448. 1953; Monod, Bull. Inst. Franç. Afr. Noir 16: 28 & 41. 1954; Gillett, Kew Bull. 1955: 133. 1955; Moldenke, Résumé 132--134, 140, 145, 157--159, 214, 238, 250, 251, 295, 302, 335, 348, & 446. 1959.

Illustrations: Monod, Contrib. Com. Ét. Hist. & Soc. Afr. Occid. Franç., sér. B, 5: pl. 21. 1940.

A common name recorded by Monod for this plant is "agtotfot"; he cites his numbers 919, 10519, and 10903 from Mauritania, not yet seen by me. Gillett cites Hagerup 345 (K) from French Soudan and Donaldson Smith 371 (Bm) from Abyssinia.

CHASCANUM NAMAQUANUM (H. Bolus) Moldenke

Additional and emended literature: Prain, Ind. Kew. Suppl. 3: 27. 1908; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 88. 1942; Moldenke, Alph. List Cit. 1: 50 (1946) and 3: 700 & 816. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 4: 448. 1953; Moldenke, Résumé 152, 239, & 446. 1959.

CHASCANUM PINNATIFIDUM (L. f.) E. Mey.

Additional and emended literature: Jacks., Ind. Kew. 1: 327 & 507. 1893; Moldenke, Geogr. Distrib. Avicenn. 31--32. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 51, 52, & 88. 1942; Moldenke, Alph. List Cit. 1: 4, 25, 30, 31, 42, 49--51, 54, 56, 59, 74, 78, 80, 102, 103, 164, 165, 176, 178, 196, 204, 206, 220, & 234 (1946), 2: 416, 536, 630, & 641 (1948), 3: 675, 707, 712, 747, 748, 751, 761, 762, 769, 780, 802, 826, 841, 866, 902, 931, 935, & 949 (1949), and 4: 981, 993, 994, 997, 1014, 1093, 1118, & 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 119, 121, & 178. 1949; Moldenke, Phytologia 4: 448--449. 1953; Moldenke, Résumé 148, 151, 152, 239, 240, & 446. 1959.

Codd describes this plant as a dense soft shrublet 9 inches tall or prostrate, with cream-colored flowers, growing in broken veld on dolomite koppie or in thornveld on red loam beside a watercourse, at altitudes of 3000 to 4300 feet, blooming in March. Van der Schyff calls it a woody shrub 1 foot tall, growing in stony ground, blooming in January.

Meeuse, in a letter to me dated March 19, 1954, maintains that the situation regarding the correct name for this species is exactly the same as for C. dehiscens (L. f.) Moldenke for which he adopts the name C. cuneifolium (L. f.) E. Mey. He says that "Meyer also quotes Buchnera pinnatifida 'Thunb.' Fl. Cap. (1823), although it is a species found in Linn. f. Suppl. Pl."

Additional citations: SOUTHWEST AFRICA: Dinter 4340 (B); Seydel 24 (B), 1026 (B). UNION OF SOUTH AFRICA: Orange Free State: L. E. Codd 3394 (Ss). Transvaal: L. E. Codd 2711 (Ss); H. Lang s.n. [Herb. Transvaal Mus. 31697] (Cb); Van der Schyff 3504 (Z).

CHASCANUM PINNATIFIDUM var. RACEMOSUM Schinz & Moldenke

Additional and emended literature: Moldenke, Geogr. Distrib. Avicenn. 32. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 88 (1942) and [ed. 2], 121 & 178. 1949; Moldenke, Alph. List Cit. 3: 740, 848, 866, & 902 (1949) and 4: 1151. 1949; Moldenke, Phytologia 4: 449. 1953; Moldenke, Résumé 148, 153, 239, 426, & 446. 1959; Moldenke, Résumé Suppl. 1: 10. 1959.

Additional citations: SOUTHWEST AFRICA: Schoenfelder 960 (B).

CHASCANUM PUMILUM E. Mey.

Additional and emended literature: Jacks., Ind. Kew. 1: 327 & 507. 1893; Range in Fedde, Repert. 38: 256. 1935; Moldenke, Geogr. Distrib. Avicenn. 31 & 32. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 50, 52, & 88. 1942; Moldenke, Alph. List Cit. 1: 50, 54, 73, 78, 113, 162, 165, & 243 (1946), 3: 780, 802, 847, & 902 (1949), and 4: 1154. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 118, 121, & 178. 1949; Moldenke, Phytologia 4: 449. 1953; Moldenke, Résumé 146, 151--153, 239, & 446. 1959.

Range, in the reference cited above, cites his no. 786 as this species, but I have not as yet seen this collection.

Additional citations: SOUTHWEST AFRICA: Dinter 5002 (B).

CHASCANUM PUMILUM var. PUBERULENTUM Moldenke

Literature: Moldenke in Fedde, Repert. 45: 319 (1938) and 46: 11. 1938; Moldenke, Revist. Sudam. Bot. 6: 22--23. 1939; Moldenke, Geogr. Distrib. Avicenn. 32. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 88 (1942) and [ed. 2], 121 & 178. 1949; Moldenke, Résumé 153 & 446. 1959.

This variety differs from the typical form of the species in having its leaf-blades obovate (not ovate) in outline, not as coarsely dentate, the teeth more antrorse and not as spreading, and the pubescence very fine and minute (puberulent).

The type of the variety was collected by N. S. Pillans (no. 242) on the upper parts of rocky "kopje" one mile south of Walle Kraal, Namaqualand, Cape of Good Hope, in October, 1924, and is deposited in the Bolus Herbarium at Capetown. The plant is said by the collector to be "uncommon". The type specimen is past the flowering stage, being in fruit.

The variety has in the past been confused with and misidentified as the typical form of the species and as C. namaquanum (H. Bolus) Moldenke by Greenway and others, but L. Bolus has truly pointed out that it "seems distinct from B[ouchea] namaquana". Pearson placed some of the specimens cited below under C. pumilum with a question.

The variety has been collected in red sand of grassveld and in dry riverbeds. It is described as "scrubby", and has been collected in fruit in October and December. The Scully 240 specimens in the Pretoria, British Museum, and Britton herbaria, cited below, were erroneously cited by me as C. pumilum on pages 319 and 11 of my monograph. In all, 8 herbarium specimens and 2 mounted photographs of the variety have been examined.

Citations: UNION OF SOUTH AFRICA: Cape of Good Hope: H. H. W. Pearson 3280 (Ct); Pillans 242 [Herb. Bolus 18192] (Ct—type, N—
isotype, N—photo of type, Z—photo of type); Scully 240 (Af, Bm, Ct, N); Wilman 2259 (Ct).

CHASCANUM RARIFLORUM (A. Terrac.) Moldenke

Additional and emended literature: Prain, Ind. Kew. Suppl. 5: 35. 1921; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 30. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 46 & 88. 1942; Moldenke, Alph. List Cit. 1: 33. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 4: 449—450. 1953; Gillett, Kew Bull. 1955: 135. 1955; Moldenke, Résumé 134, 239, 298, & 446. 1959.

Gillett has pointed out, in the reference cited above, that the type and only known collection of this species is from Abyssinia, not from Italian Somaliland as I have stated in my earlier publications. He points out that "From the description this is a very distinct plant which requires further investigation."

CHASCANUM SCHLECHTERI (Gürke) Moldenke

Additional and emended literature: Thiselton-Dyer, Ind. Kew. Suppl. 2: 28. 1904; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 32. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 88. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 81. 1948; Moldenke, Alph. List Cit. 3: 902. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 121 & 178. 1949; Moldenke, Phytologia 4: 450. 1953; Moldenke, Résumé 153, 239, 297, & 446. 1959.

CHASCANUM SESSILIFOLIUM (Vatke) Moldenke

Additional and emended literature: Jacks., Ind. Kew. 1: 327. 1893; J. G. Baker in Thiselton-Dyer, Fl. Trop. Afr. 5: 283. 1900; Hill, Ind. Kew. Suppl. 9: 61. 1938; Moldenke, Geogr. Distrib. Avicenn. 30. 1939; Hutchinson & Bruce in Gillett, Kew Bull. 1941: 176. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45 & 88. 1942; Moldenke, Alph. List Cit. 1: 11 & 164 (1946), 2: 580 (1948), and 3: 673. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 110 & 178. 1949; Moldenke, Phytologia 4: 450. 1953; Gillett, Kew Bull. 1955: 134. 1955; Moldenke, Résumé 135, 239, & 446. 1959.

Gillett reports that the Gillett 4550 cited by Hutchinson & Bruce as C. africanum (Stachytarpheta hildebrandtii) is actually C. sessilifolium. He also cites Hildebrandt 855a (B--type), Gillett 4518 and 3992, and Bally 7322, all from British Somaliland, the last three deposited in the Kew herbarium. He notes that "I have accepted this species in the sense in which it has been understood by Baker in the Flora of Tropical Africa and by Moldenke. Neither of these botanists saw Hildebrandt's type specimen which comes from an area considerably to the east of that of the other specimens. There are certain discrepancies between Vatke's des-

cription and the species as here understood (notably corolla length). It is desirable that close search should be made for this genus in Hillebrandt's original locality." He designates the James & Thrupp collection as a "neotype".

Collectors describe the plant as 1 meter tall, with white or cream-colored corollas, growing in grassy places on mountains among Buxus hildebrandtii Baill., on stony sandstone slopes, and at the edge of Juniperus forests, at altitudes of 1290 to 1950 m.

ADDITIONAL NOTES ON THE GENUS CORNUTIA. I

Harold N. Moldenke

Since the publication in 1936 of my monograph of this genus much information of supplementary nature has come to light and many additional specimens have been studied. The present paper will put on record this additional material and will be followed by additional papers in the series. Full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material was examined, in whole or in part, will be found in *Phytologia* 5: 154--159 (1955), 6: 242 (1958), and 7: 91--92 (1959), 123--124 (1960), and 293 (1960).

CORNUTIA Plum.

Additional synonymy: Kornutia Adans., *Fam. Pl.* 2: 12. 1763. Cornutia L. ex Reichenb., *Conspect. Reg. Veg.* 1: 117. 1828. Cornutea L. ex Dumort., *Analys. Fam. Pl.* 22. 1829. Cornutia Gaertn. ex Moldenke, *Prelim. Alph. List Invalid Names* 23, in syn. 1940.

Literature: Plum., *Nov. Pl. Amer. Gen.* 32, pl. 17. 1703; Vaill., *Hist. Acad. Roy. Sci. (Gall.)* 1722: 201 & 273. 1724; L., *Gen. Pl.*, ed. 1, 366. 1737; L., *Hort. Cliff.* 319. 1739; L., *Fl. Zeyl.*, ed. 1, 195 (1747) and ed. 2, 195. 1748; L., *Sp. Pl.*, ed. 1, 628. 1753; L., *Gen. Pl.*, ed. 5, 276. 1754; Plum., *Pl. Amer.*, ed. Burm., pl. 106, fig. 1. 1757; Adans., *Fam. Pl.* 2: 12 & 199. 1763; L., *Gen. Pl.*, ed. 6, 316. 1764; Burm. f., *Fl. Ind.* 132, pl. 41, fig. 1. 1768; Medic., *Beobacht.* 112. 1783; Lam., *Encycl. Méth.* 1: 54. 1783; Ait., *Hort. Kew.* 2: 353. 1789; Lour., *Fl. Cochinch.*, ed. 1, 2: 387. 1790; Neck., *Elem. Bot.* 1: 328--358. 1790; Jacq., *Hort. Schönbr.* 1: 60, pl. 114. 1797; Lam., *Tabl. Encycl. Méth.* 3: pl. 541. 1797; Willd., *Sp. Pl.* 3: 322. 1800; Gaertn. f. in Gaertn., *Fruct. & Sem. Pl.* 3: 172, pl. 213. 1805; Mirb., *Hist. Nat. Pl.*, ed. 3, 15: 213. 1805; Pers., *Syn. Pl.* 2: 143. 1806; Bot. Zeit. Regensb. 5: 321--330. 1806; Gaertn. f., *Fruct.* 3: pl. 213. 1807; Tratt., *Archiv Gewächsk.* 1: 14 & 55, pl. 87. 1812; Tratt., *Ausg. Taf. Arch.* 1: 9. 1813; Tratt., *Archiv Gewächsk.* 2: 144. 1814; H.B. K., *Nov. Gen. & Sp. Pl.* 2: 247--248. 1818; Roem. & Schult., *Syst.*

Veg. 3: 98. 1818; Steud., Nom. Bot., ed. 1, 228 & 414. 1821; G. Savi, Fl. Ital. 3: pl. 88. 1824; Sims in Curtis, Bot. Mag. 53: pl. 2611. 1825; Spreng., Syst. Veg. 1: 39. 1825; Mordant de Launay, Herb. Amat. 8: pl. 505. 1827; Edwards, Bot. Reg. 14: pl. 1204. 1828; Reichenb., Conspect. Reg. Veg. 1: 117, 1828; Dumort., Analys. Fam. Pl. 22 & 87. 1829; Schlecht. & Cham., Limnaea 5: 97. 1830; A. Dietr. in Willd., Sp. Pl. 1: 252—253. 1831; Wall., Numer. List 87, no. 1834. 1831; Géel, Sert. Bot. cl. 14. 1832; Wall., Numer. List 216, no. 6319. 1832; Reichenb., Fl. Exot. 4: pl. 234. 1835; Drapiez, Herb. Amat. Fl. 8: pl. 538. 1835; Steud., Nom. Bot., ed. 2, 1: 422 & 776. 1840; Walp., Repert. 4: 80. 1844; Poepp. & Endl., Nov. Gen. & Sp. Pl. 3: 63, pl. 269. 1845; Schau. in A. DC., Prodr. 11: 630 & 681—682. 1847; Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 257. 1857; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 220. 1863; Bocq., Adansonia 3: [Rev. Verbenac.] 137, pl. 12. 1863; Aschers., Bot. Zeit. 21: 53. 1863; Aschers., Fl. Brandenburg. 728—729. 1864; Miq., Prolus. Fl. Jap. 317. 1866—1867; Miq., Bijdr. Fl. Jap. 300—301. 1869—1871; Benth. in Benth. & Hook. f., Gen. Pl. 2 (2): 1153. 1876; Matsum., Cat. 203. 1886; Engl. in Engl. & Prantl, Nat. Pflanzenfam. 2 (5): 40. 1888; Sessé & Moc., La Naturaleza, ser. 2, 1: app. 103. 1889; Kuntze, Rev. Gen. Pl. 2: 506. 1891; Jacks., Ind. Kew. 1: 59, 386, 619, & 1176. 1893; Fawcett, Prov. List Indig. Nat. Fl. Pl. Jamaic. 30. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 169. 1894; Trimen, Handb. Fl. Ceylon 3: 352—353. 1895; Millsp., Field Mus. Publ. Bot. 1: 316. 1896; Voss, Vilmorin's Blumeng. no. 3405. 1896; Aschers. in Aschers. & Graebn., Fl. Nordost. Deutsch. Flachl. 183. 1898; Urb., Symb. Ant. 1: 395. 1899; Mak., Bot. Mag. Tokyo 16: 173. 1902; Mak., Fl. Jap. 2: 81. 1902; Thiseit.-Dyer, Ind. Kew. Suppl. 2: 48. 1904; Aschers. & Graebn., Syn. Mitteleur. Fl. 3: 54—55. 1905; Matsum., Ind. Bot. Jap. 2 (1): 199—200. 1905; J. D. Sm., Bot. Gaz. 40: 10. 1905; Hayek in Engl., Bot. Jahrb. 42: 172. 1908; Prain, Ind. Kew. Suppl. 3: 48. 1908; Gerth van Wijk, Dict. Plantnames 1: 372—373. 1911; Nakai, Journ. Coll. Sci. Imp. Univ. Tokyo 31: 251. 1911; Prain, Ind. Kew. Suppl. 4: 56. 1913; L. H. Bailey, Stsnd. Cycl. Hort. 1604—1605. 1915; Koidz., Bot. Mag. Tokyo 30: 326. 1916; Gerth van Wijk, Dict. Plantnames 2: 21, 176, 178, & 185. 1916; Urb. in Fedde, Repert. Beih. 5: 60. 1920; E. D. Merr., Philip. Journ. Sci. Bot. 19: 377. 1921; L. H. Bailey, Gent. Herb. 1: 133. 1923; Britton & P. Wils., Scient. Surv. Porto Rico 6: 148—149. 1925; Salvador Minist. Instrucc. Publ., Fl. Salvador. 1: pl. 82. 1926; Seymour, Host Ind. Fungi N. Am. 588—589. 1929; Hill, Ind. Kew. Suppl. 7: 56. 1929; Nakai, Bot. Mag. Tokyo 44: 26—28 & 513—514. 1930; Stapf, Ind. Lond. 2: 301 (1930) and 3: 443. 1930; L. H. Bailey, Gent. Herb. 2: 132—141. 1930; Stearn, Gard. Chron. 90: 27, 48, & 89. 1931; L. H. Bailey, Gent. Herb. 2: 438. 1932; Miyabe & Kudo, Journ. Fac. Agric. Sapporo 26: 315. 1932; Junell, Symb. Bot. Upsal. 4: 90—91, fig. 137—139. 1934; Moldenke, Brittonia 1: 471. 1934; Honda, Journ. Jap. Bot. 11: 572. 1935; Maekawa, Journ. Jap. Bot. 11: 245 & 687—689. 1935; Honda, Bot. Mag. Tokyo 49: 696. 1935; Cat. Quinta Perez Estr. San

Pedro Sula Suppl. (mss.). 1935; Moldenke in Fedde, Repert. 40: 118 & 153--205. 1936; Moldenke, Chron. Bot. 3: 311. 1937; Lundell, Carnegie Inst. Wash. Bull. 478: 75, 111, 113, 138, & 183. 1937; Standl., Field Mus. Publ. Bot. 18: 1004--1005. 1938; Moldenke, Lilloa 4: 332. 1939; Moldenke, Geogr. Distrib. Avicenn. 1, 5--8, 10, 11, 14--20, 22, 23, 26, 38, & 39. 1939; Moldenke in Fedde, Repert. 46: 201. 1939; Moldenke, Alph. List Common Names 1, 3, 5, 6, 10--12, 15, 18, 19, 21--25, 27, 31, 33, & 34. 1939; Moldenke, Carnegie Inst. Wash. Publ. 522: 149, 203--207, & 219--223. 1940; Yunker, Field Mus. Publ. Bot. 9: 329. 1940; Moldenke, Prelim. Alph. List Invalid Names 1, 4, 10, 14, 23, 24, 27, & 28. 1940; Moldenke, Suppl. List Common Names 6, 13, & 16. 1940; Worsdell, Ind. Lond. Suppl. 1: 256 & 487--488. 1941; Calderón & Standl., Fl. Salvad., ed. 2, 237. 1941; Steere, Contrib. Univ. Mich. Herb. 8: 61. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16, 19--23, 25--29, 31, 33--36, 73, & 92. 1942; Moldenke, Alph. List Invalid Names 1, 4, 8, 11, 22, 26, & 27. 1942; Niemeyer & Stellfeld, Arquiv. Mus. Paran. 3: 8. 1943; Moldenke, Phytologia 2: 102. 1944; Moldenke, Castanea 10: 41 & 45. 1945; Reko, Bol. Soc. Bot. Mex. 4: 35. 1946; Menninger, 1947 Cat. Flow. Trees 45. 1946; Moldenke, Alph. List Cit. 1: 2, 4, 6--10, 21, 30, 36, 37, 39, 40, 42, 50--53, 57, 58, 61, 67, 68, 71, 75--77, 88, 89, 93, 101, 106, 113--116, 118, 122, 123, 131--136, 148, 163, 166, 168, 170, 172--174, 177--180, 182, 184, 189, 193, 196, 201, 208, 209, 216, 218, 221, 222, 227, 231, 232, 234, 241, 243, 247, 249, 251--253, 258, 259, 262, 265, 267, 268, 274--276, 278, 299, 301--303, 308, 312--314, 319--321, 324, & 325. 1946; Svenson, Am. Journ. Bot. 33: 419 & 480. 1946; J. S. Beard, Journ. N. Y. Bot. Gard. 47: 239. 1946; Moldenke, Phytologia 2: 131. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 8, 11, 16, & 19. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 61 & 114. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 16, 18, 20, 21, 23, 24, 32, 54, 77, & 84. 1948; Moldenke, Alph. List Cit. 2: 327, 329--336, 338--347, 350--352, 359, 389, 390, 401--403, 408, 411, 415, 419, 422, 425--429, 433--437, 443, 459, 481, 482, 484--489, 491, 498, 499, 501--503, 528, 531, 536, 539, 544, 549, 550, 553, 557, 561, 563--566, 569, 570, 573, 576, 577, 587, 588, 593, 600, 603, 608, 610, 611, 615, 616, 618, 620, 625, 640, 642, 643, 647, 649, 650, & 652 (1948), 3: 655, 658, 659, 663, 664, 666--668, 676, 677, 679, 687, 695, 697, 705, 706, 708, 709, 713--717, 725, 726, 731, 736, 740, 741, 745, 753--755, 757, 758, 768, 775--777, 779, 780, 801, 802, 805, 808--810, 817--819, 821--823, 825--827, 834, 835, 839, 841, 842, 844, 848, 852, 853, 857, 867, 868, 877, 887, 888, 891, 894, 895, 898, 900, 902, 906, 912, 916, 918, 919, 925, 926, 928--930, 932, 934, 936, 937, 939--941, 944, 945, 947--950, 959, 960, 964, 965, 969, 971--974, & 978 (1949), and 4: 981--983, 986, 988, 993, 999, 1000, 1001, 1005--1009, 1012, 1013, 1016, 1017, 1020--1026, 1029--1031, 1033--1040, 1042, 1043, 1045--1053, 1055, 1059, 1061--1067, 1069, 1070, 1073, 1074, 1076, 1079, 1080, 1082, 1094, 1097, 1098, 1100, 1105, 1109, 1125, 1131, 1133, 1134, 1138, 1141, 1144--1146, 1151, 1152, 1186, 1187, 1207, 1221, 1237, 1241, 1246, 1254, & 1304. 1949; Little, Carib. Forester 9: 221. 1949; W. L. Phillips, Cat. Pl.

Fairchild Trop. Gard. 18. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29, 35—40, 43, 46, 47, 49, 53—56, 59, 63, 69, 72, 76, 160, & 184. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 6. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Menninger, 1950-1951 Offer 300 Diff. Flow. Trop. Trees [1]. 1950; F. A. Barkley, Determinac. Ejemp. Herb. Fac. Nac. Agron. Medellin 2 (1): 14. 1950; Roig, Dicc. Bot. 1: 849 & 2: 1012. 1953; Moldenke, Journ. Calif. Hort. Soc. 15: 86. 1954; Moldenke, Mem. N. Y. Bot. Gard. 9: 176. 1955; Moldenke in Humbert, Fl. Madag. 174: 62 & 269. 1956; Alain in León & Alain, Fl. Cuba 4: 280 & 313—314, fig. 135. 1957; Moldenke, Résumé 35, 41, 43—49, 51, 55, 56, 58, 60, 61, 66, 70, 77—79, 82, 88, 217, 218, 228, 232, 242, 248, 275, 276, 299—302, 389, 409, 423, 425, & 454. 1959; Moldenke, Résumé Suppl. 1: 3 & 4. 1959; Menninger, 1960 Price List Flow. Trees [3]. 1960.

It is of interest to note that Bentham in 1876 recognized six species in this genus; Briquet in 1894 reduced this to 4 or 5. We now recognize 25 species, varieties, and forms in the genus. Reichenbach, in the reference cited above (1828), lists "Cornutia L." as a valid genus -- with Hosta Jacq. as a synonym -- in the family Labiatae [= Lamiaceae], section Verbeneae. Jacquin's genus Hosta was still recognized as a valid genus, distinct from Cornutia, by Steudel in 1821. Cornutioides L., Fl. Zeyl. 195 (1747), Midi Herm., and Sambucus Burm. [not Sambucus Tourn., 1753] are given by Adanson, Fam. Pl. 2: 199, in syn. (1763) and by me in my Alph. List Invalid Names Suppl. 1: 8, 16, & 19 (1947) as synonyms of Cornutia Plum. According to Trimen, Handb. Fl. Ceylon 3: 352—353 (1895), however, they are synonyms of Premna serratifolia L. [= P. obtusifolia R. Br.]. Jackson, in Ind. Kew. 1: 619 (1893), lists Cornutioides L. as a "gen. dub."

Standley states that the members of the genus Cornutia are shrubs or small trees with brittle branches. The gynoecium morphology is discussed by Junell in the reference given above (1934), where he points out certain resemblances with that of the genus Premna L.

Common names for members of the genus as a whole are given in French as "agnantes" by Mirbel, "agnanthe" by Gerth van Wijk, and "cornutie" by Necker. In English the name is "cutletwood".

The Macbride photos 20351, widely distributed as Cornutia barbieri Mart. is actually Arrabidaea corchorioides (Cham.) P. DC. in the Bignoniaceae.

In the Linnean Herbarium at London, under genus 784, Cornutia, specimen number "1" is labeled "pyramidata" in Linnaeus' own handwriting and IS what we call C. pyramidata L. today. The actual type of the species, however, is supposed to be a specimen in the Hortus Cliffortianus herbarium, page 319, now preserved in the British Museum (Natural History), but is not there. A note states that it was incorporated in the general herbarium of that museum, where it is also now not to be found. I feel, therefore, that this

sheet in the Linnean Herbarium may well be designated as the logotype. Specimen number "2" is unnamed, but bears on the top of the sheet the notation "CLERODENDRUM" [Mr. Savage states that this style of generic name on the top of the sheet was a very old one of Linnaeus, later discarded by him] and "a India". The specimen is plainly what we now call Clerodendrum incisum var. macrosiphon (Hook. f.) C. B. Clarke. Jackson says that the sheet is annotated "Br" [meaning Patrick Browne] and that the "India" means "India [occid.]". It seems to me that the initial is rather "D" and may stand for Dalman, as Jackson himself interprets a similar scrawl on the tenth specimen under Vitex ["V. pinnata"] from India.

Several corrections need to be made in the text of my monograph published in Fedde, Repert. 40: 153—205 (1936). On page 155 the statement should read "pistil mostly included"; on page 157 the abaxial corolla-lip is "obovate-, broadly elliptic-, ovate-, or oblong-lingulate"; on page 199 the date given for Miq., Bijdr. Fl. Jap. 304 should be "1869". In the key on pages 159—161, delete lines 1, 5, and 5a. For line 1 substitute the following:

1. Calyx deeply lobed.

1'. Leaf-blades thin-textured, appressed-puberulent beneath; French Guiana.....1. C. pubescens.

1'a. Leaf-blades thick-textured, tomentellous beneath; Puerto Rico.....9. C. obovata.

For lines 16 and 16a substitute the following:

16. Tomentum on branchlets and rachis matted; South American.

16'. Petioles 4.5--5 cm. long; leaf-blades 27--28 cm. long and 9.6--10.1 cm. wide; Brazil.....3. C. australis.

16'a. Petioles 1--2 cm. long; leaf-blades 8--15 cm. long and 3--8.5 cm. wide; Ecuador. 3a. C. australis var. occidentalis.

16a. Tomentum on branchlets and rachis spreading; Mexican & Central American.

From line 22 delete "6. C. latifolia" and insert the following:

23. Corolla blue or bluish-purple.....6. C. latifolia.

23a. Corolla white.....6a. C. latifolia f. alba.

To the list of Excluded Species make the following additions and corrections:

Cornutia brasiliensis Miers ex Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 220. 1863 = Arrabidaea corchorioides (Cham.) P. DC., Bignoniaceae.

Cornutia corymbosa Burm. f., Fl. Ind. 132. 1768 = Premna obtusifolia R. Br.

Cornutia cymosa Donn. Sm., Bot. Gaz. 40: 10. 1905 = Cordia cymosa (Donn. Sm.) Standl., Ehretiaceae.

Hosta latifolia (Miq.) Matsum., Ind. Pl. Jap. 2 (1): 200. 1905 = H. ventricosa (Salisb.) Stearn, Convallariaceae.

Hosta miquelii Moldenke in Fedde, Repert. 40: 198. 1936 = H. ventricosa (Salisb.) Stearn, Convallariaceae.

CORNUTIA AUSTRALIS Moldenke

Literature: Moldenke in Fedde, Repert. 40: 161, 171--173, & 201. 1936; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 92. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 76 & 184. 1949; Moldenke, Résumé 88 & 454. 1959.

The Widgren specimen cited below was originally identified by the collector as Aegiphila acutangula Widgren.

Additional citations: BRAZIL: Minas Gerais: Widgren s.n. (S).

CORNUTIA AUSTRALIS var. OCCIDENTALIS Moldenke, Castanea 10: 45. 1945.

Literature: Moldenke, Castanea 10: 41 & 45. 1945; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 184. 1949; Little, Carib. Forester 9: 221. 1949; Moldenke, Résumé 79 & 454. 1959.

This variety differs from the typical form of the species in having the petioles 1--2 cm. long and the leaf-blades 8--15 cm. long and 3--8.5 cm. wide.

The type of the variety was collected by Elbert Luther Little, Jr. (no. 6581) in a pasture at the base of a hill 7 km. west of Guayaquil, Ecuador, on June 13, 1943, and is deposited in the United States National Herbarium at Washington.

Citations: ECUADOR: Guayas: E. L. Little 6581 [U. S. Forest Serv. 98531] (W--1878637--type).

CORNUTIA COERULEA (Jacq.) Moldenke

Additional synonymy: Hosta caerulea Jacq. apud Jacks., Ind. Kew. 1: 1176, in syn. 1893.

Literature: L., Sp. Pl., ed. 1, 628. 1753; Ait., Hort. Kew. 2: 353. 1789; Jacq., Hort. Schönbr. 1: 60, pl. 114. 1797; Willd., Sp. Pl. 3: 322. 1800; Pers., Syn. Pl. 2: 143. 1806; Bot. Zeit. Regensb. 5: 321--330. 1806; Gaertn. f., Fruct. 3: pl. 213. 1807; Tratt., Archiv Gewächsk. 1: 14, pl. 87. 1812; Tratt., Ausg. Taf. Arch. 1: 9. 1813; Steud., Nom. Bot., ed. 1, 228 & 414. 1821; G. Savi, Fl. Ital. 3: pl. 88. 1824; Sims in Curtis, Bot. Mag. 53: pl. 2611. 1825; Edwards, Bot. Reg. 14: pl. 1204. 1828; Géel, Sert. Bot. cl. 14. 1832; Reichenb., Fl. Exot. 4: pl. 234. 1835; Drapiez, Herb. Amat. Fl. 8: pl. 538. 1835; Steud., Nom. Bot., ed. 2, 1: 422 & 776. 1840; Kuntze, Rev. Gen. Pl. 2: 506. 1891; Jacks., Ind. Kew. 1: 1176. 1893; Fawcett, Prov. List Indig. Nat. Fl. Pl. Jamaic. 30. 1893; Gerth van Wijk, Dict. Plantnames 1: 372--373 (1911) and 2: 21, 176, 178, & 185. 1916; Stapf, Ind. Lond. 2: 301 (1930) and 3: 443. 1930; Moldenke in Fedde, Repert. 40: 159, 189--191, 200, 202, & 203. 1936; Moldenke, Geogr. Distrib. Avicenn. 6 & 38. 1939; Moldenke, Prelim. Alph. List Invalid Names 23, 24, 27, & 28. 1940; Moldenke, Alph. List Invalid Names 22, 26, & 27. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25, 73, & 92. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46, 160, & 184. 1949; Moldenke, Résumé 55, 217, 276,

299, 300, & 454. 1959.

Illustrations: Jacq., Hort. Schönbr. 1: 60, pl. 114 (in color). 1797; Gaertn. f., Fruct. 3: pl. 213. 1807; Tratt., Archiv Gewächsk. 1: pl. 87. 1812; Tratt., Ausg. Taf. Arch. 1: 9 (in color). 1813; G. Savi, Fl. Ital. 3: pl. 88. 1824; Sims in Curtis, Bot. Mag. 53: pl. 2611 (in color). 1825; Edwards, Bot. Reg. 14: pl. 1204 (in color). 1828; Gêel, Sert. Bot. cl. 14. 1832; Reichenb., Fl. Exot. 4: pl. 234 (in color). 1835; Drapiez, Herb. Amat. Fl. 8: pl. 538 (in color). 1835.

The leaf-blades of this plant are actually membranous, not "chartaceous" as stated by me on page 189 of my monograph of the genus (1936). Drapiez, in the reference cited above (1835), reduces C. punctata Willd. to synonymy under C. pyramidata L., but this disposition is erroneous. Gerth van Wijk lists five French common names under C. pyramidata which he says may actually apply rather to "C. punctata". Trattinick calls it the "punctirte Cornutia".

Additional citations: WEST INDIES: Island undesignated: Herb. Adanson s.n. (P). CULTIVATED: Austria: Herb. Jacquin f. s.n. [Macbride photos 34306] (F--976286—photo of cotype, Kr—photo of cotype, N—photo of cotype). France: Collector undesignated 58 [Herb. Jussieu 5078] (P). Germany: Herb. Kummer s.n. (Mu--1451). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated s.n. (Dc); Herb. Kummer s.n. (Mu--1453); Herb. Lamarck s.n. (P); Herb. Mus. Bot. Lund. s.n. (Lu). MOUNTED ILLUSTRATIONS: color plate XIV.C² (Br).

CORNUTIA GRANDIFOLIA (Schlecht. & Cham.) Schau.

Additional synonymy: Hosta grandiflora Schlecht. ex Steud., Nom. Bot., ed. 2, 1: 422 & 776, in syn. 1840. Cornutia grandiflora Steud., Nom. Bot., ed. 2, 1: 422. 1840. Callicarpa dentata Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 10, in syn. 1940. Cornutia grandiflora (Cham. & Schlecht.) Schau. ex Moldenke, Prelim. Alph. List Invalid Names 23, in syn. 1940. Cornutia grandiflora Schau. ex Moldenke, Prelim. Alph. List Invalid Names 23, in syn. 1940. Hostia grandifolia Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 11, in syn. 1947.

Literature: Roem. & Schult., Syst. Veg. 3: 98. 1818; Schlecht. & Cham., Linnaea 5: 97. 1830; A. Dietr., Sp. Pl. 1: 252. 1831; Wall., Numer. List 216, no. 6319. 1832; Steud., Nom. Bot., ed. 2, 1: 422 & 776. 1840; Schau. in A. DC., Prodr. 11: 682. 1847; Kuntze, Rev. Gen. Pl. 2: 506. 1891; Jacks., Ind. Kew. 1: 386. 1893; Seymour, Host Ind. Fungi N. Am. 588--589. 1929; Cat. Quinta Perez Estr. San Pedro Sula [Honduras] suppl. [mss.] 1935; Moldenke in Fedde, Repert. 40: 118, 161, 163--167, & 200--205. 1936; Standl., Field Mus. Publ. Bot. 18: 1004. 1938; Moldenke, Alph. List Common Names 3, 10, 23, & 34. 1939; Moldenke, Geogr. Distrib. Avicenn. 14--18. 1939; Moldenke, Prelim. Alph. List Invalid

Names 10, 23, & 27. 1940; Yuncker, Field Mus. Publ. 9: 329. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 204. 1940; Calderón & Standl., Fl. Salvad., ed. 2, 237. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16, 19, 21-23, 73, & 92. 1942; Moldenke, Alph. List Invalid Names 8, 22, & 26. 1942; Moldenke, Phytologia 2: 102. 1944; Menninger, 1947 Cat. Flow. Trees 45. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 11. 1947; W. L. Phillips, Cat. Pl. Fairchild Trop. Gard. 18. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29, 35-40, 160, & 184. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 6. 1949; Menninger, 1950-1951 Offer. 300 Diff. Flow. Trop. Trees [1]. 1950; Matuda, Am. Midl. Nat. 44: 576. 1950; Moldenke, Résumé 35, 41, 43-46, 48, 217, 242, 275, 276, 299, 301, & 454. 1959.

The species is often described as a medium-sized or large shrub or small tree, the stems 4-angled, and the corolla lavender, lavender-violet, or violet, blooming also in February and April, fruiting already in June, found at altitudes sometimes as low as 30 meters. Standley records the common name "pavilla", and says that in Costa Rica the species is frequent in thickets and forests of the central region, ascending to 1950 meters altitude, in the region of San Ramon, and in the Atlantic "tierra caliente". He describes it as a shrub or tree 3-9 meters tall, the trunk sometimes to 45 cm. in diameter, the bark rugose, corky, and creamy-gray or pale-brown, the branchlets densely villous-tomentose with spreading hairs, the leaves long-petiolate, their blades elliptic to broadly ovate, densely short-villous beneath, the inflorescence in thyrsoid panicles, the corolla bluish-violet, about 8 mm. long, and the fruits densely pilose. He says "The tree is a showy and handsome one when decorated with the abundant, large panicles of bright-colored flowers".

It has been found by collectors also in thickets, wet open thickets, pastures, secondary forests, foothills, and along railroad tracks. Another vernacular name recorded for it is "zapalope", and it has been confused by collectors with Cordia sp. The specific name is sometimes upper-cased for no valid reason. Menninger calls it "cornutia" and describes it as a "Costa Rican evergreen shrub or small tree of Verberna family bearing quantities of small blue flowers, often showy." He charges \$1 for a 1-2-inch plant, \$3 for a 3-4-foot specimen. Roig reports the wood as useful in Cuba, where the plant is cultivated.

The name, Callicarpa dentata Pav., published as though new in synonymy by me on page 163 of my monograph (June 30, 1936), was actually first published by me on page 118 of the same volume on March 31 of that year. The Index Kewensis reference, also on page 163, should be 1893, not "1895". The Hoffmann 117 and 517 cited on page 167 as from "Province undetermined" are actually from the province of San José, Costa Rica, as is also Pittier 237 bis. Stork 508 is from Limón, and Tonduz s.n. [Tucurrique, Las Vueltas] is from Cartago, Costa Rica. The Lévy 1177 collection is from Rivas, Nicaragua, according to a letter received by me from

the Nicaraguan Embassy in Washington, dated September 12, 1945. The Liebmann 11306 cited on page 166 from "State undetermined" is probably from the state of Oaxaca, Mexico, according to my friend and colleague, Dr. M. Martinez.

Additional citations: MEXICO: Chiapas: Matuda 1652 (Mh, Mi, Mi, N). Oaxaca: Martinez & Calderón 15 (Me); R. E. Schultes 783 (Oa—13589). Vera Cruz: Bourgeau s.n. [Orizaba] (P, P, P, P); Hahn 228 (P), 271, in part (P), s.n. [Misantla, juin 1866] (P); MacDaniels 837 (F—862844); Plunkett s.n. [Jalapa, July 20, 1932] (La, La); Schiede 81 [Macbride photos 34307] (F—976287—photo of cotype, Kr—photo of cotype, N—photo of cotype, P—cotype); Wawra 1045 (V). State undetermined: Sessé, Mociffo, Castillo, & Maldonado 518 ["294"] (F—850427, Q), 5219 (F—845532). GUATEMALA: Alta Verapaz: H. V. Johnson 895 (La); Türkheim 7935 (Mu—3973), II.400 [Herb. Hort. Thenensis I.4197] (Br, Ed, Ed), s.n. [June 1879] (Vu), s.n. [1906] (Vt). Escuintla: Muenschner 12414 (F—905262). BRITISH HONDURAS: Gentle 1685 (Dp, E—1097743, I, Mi, N, S); C. L. Lundell 6577 (Au, F—894358, Mi, N, N). HONDURAS: Atlántida: Mallert 2005 (N); Yuncker 4571 (Dp, E—1086972, F—749167), 5141 (Dp); Yuncker, Koepper, & Wagner 8298 (Dp, Mi, N, S). Cortés: Hjalmarsson 15 (S), s.n. (S). NICARAGUA: Rivas: Lévy 1177 (P). COSTA RICA: Alajuela: Brenes 4859 [18] (F—853596), 13623 (F—857054). Cartago: Holm & Iltis 113 (N); F. L. Stevens 371 (Ur). Puntarenas: Biolley 954 (Br); Tonduz s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 9744] (Br, Br). San José: Pittier 237 (Br), 237 bis (Br, Br); Tonduz 7594 (Br). PANAMA: Coclé: Hunter & Allen 537 (E—1121314). CULTIVATED: Cuba: Moldenke & Moldenke 19888 (N). Florida: Menninger s.n. [August 26, 1946] (N). LOCALITY OF COLLECTION UNDETERMINED: Collector undesigned 17 (Q).

CORNUTIA GRANDIFOLIA var. INTERMEDIA Moldenke

Literature: Moldenke in Fedde, Repert. 40: 160, 167—168, & 200—205. 1936; Moldenke, Alph. List Common Names 12, 15, & 22. 1939; Moldenke, Geogr. Distrib. Avicenn. 15, 16, & 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19, 21—23, & 92. 1942; Moldenke, Phytologia 2: 102. 1944; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 35, 37—40, & 184. 1949; Moldenke, Journ. Calif. Hort. Soc. 15: 86. 1954; Moldenke, Résumé 41, 44—46, 48, 218, & 454. 1959; Menninger, 1960 Price List Flow. Trees [3]. 1960.

The variety is described by collectors as a shrub or slender tree, 2.5—17 m. tall, the trunk slender, its base to 45 cm. in diameter, sometimes divided at the base into 2 trunks; bark glabrous, cream-gray to pale gray-brown or striated with light-brown, rugose, with a cork-like appearance; wood soft, pale brownish-yellow where cut; stems 4-angled or nearly square; cambium layer nearly white; leaves thickened, lax, soft, velvety or plush-like, the young ones showing a silky sheen of violet-

purple; flowers 12—15 mm. long, sometimes in large panicles, blooming several times a year; corolla lilac, blue, lavender-violet, or dark-violet, dropping soon after opening.

Smith says "this is a very variable species in form of leaves, stature, size, color of flowers and time of inflorescence or several distinct forms found here.....blooms through long season, thinly distributed species.....in upper limit of tropical zone, Pacific watershed, in shade of forest, clay loam, shallow humus or mold, rather rare at 6500 ft., more common at 4000 to 5000 feet altitude." He says that the "leaf pedicels" [petioles] are tinged violet.

It has been found in bush country, rocky soil in ravines on hillsides, along trails, on hillslopes facing the north edge of forests, and in half-shade with 4 or 5 hours of sunlight daily. Von Hagen records the common name "cucaracho", and found it flowering and fruiting in September. Popenoe found it flowering in August. It has been collected at 600 m. altitude in Panama, 665 m. in Honduras, 1100 m. in Mexico, and 2165 m. in Costa Rica. It has been misidentified in herbaria as the typical form of C. grandifolia, to which the vernacular name recorded above is also applied.

The Tejada 243 cited on page 168 of my monograph (1936) as from "Department undetermined" is actually from Sacatepéquez, Guatemala. The Hartweg 610, also so cited on the same page, is inscribed "Ingenio & Ayarza" on some labels — the former locality is in the department of Amatitlan, and the latter in Santa Rosa, Guatemala. The Paris sheet of this collection is mislabeled "Mexico".

Additional citations: MEXICO: Oaxaca: R. E. Schultes 783 (Oa). GUATEMALA: Amatitlan: Hartweg 610, in part (Lu, P). Escuintla: J. R. Johnston 972 (F—907497); Seler & Seler 2560 (Du—283953, Gg—245903). Santa Rosa: Heyde & Lux 2957 (Mu—1753, Us, Vu). HONDURAS: Copan: Popenoe 796 (Ar—1793). Yoro: Von Hagen & Von Hagen 1053 (F—944355, N). COSTA RICA: Alajuela: Brenes s.n. [May 15, 1902] (F, Ml, N, Or, Pa, Si); A. Smith 166 (F—918664), 4113 (F—905221), A.54 (F—941334, N), H.242 (F—923454), NY.166 (N). San José: M. Valerio 1645 (F—905216). PANAMA: Coclé: P. H. Allen 4222 (E); Hunter & Allen 537 (N). Panamá: C. W. Dodge 10723 (S). CULTIVATED: California: Mathias 2291 (Gg—363925).

CORNUTIA GRANDIFOLIA var. NORMALIS (Kuntze) Moldenke

Literature: Kuntze, Rev. Gen. Pl. 2: 506. 1891; Moldenke in Fedde, Repert. 40: 160, 170—171, & 200—204. 1936; Standl., Field Mus. Publ. Bot. 18: 1004. 1938; Moldenke, Geogr. Distrib. Avicenn. 17 & 18. 1939; Moldenke, Alph. List Common Names 10, 22, & 23. 1939; Moldenke, Prelim. Alph. List Invalid Names 24. 1940; Moldenke, Alph. List Invalid Names 22. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 23, 73, & 92. 1942; Moldenke, Phytologia 2: 102. 1944; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39, 40, 160, & 184. 1949; Moldenke,

Résumé 46, 48, 49, 218, 276, & 454. 1959.

This plant is described by collectors as a coarse woody shrub or tree, 2--15 m. tall, with a trunk diameter at breast height of 1/2 inch, the larger stems round, the smaller ones tetragonal in cross-section, the crushed leaves and flowers with a rank aromatic minty odor, the corolla purple, purplish-blue, or bluish-violet. It has been collected on savannas, in open scrub and secondgrowth thickets, clearings, and pastures, and on forested riverbanks, blooming also in February, April, May, and August. It ascends from 20 m. altitude in Panama to 900 m. in Costa Rica. It is reported by Brenes to be cultivated in gardens at Puerto Jiménez, Puntarenas, Costa Rica, introduced there from Chiriquí, Panama. Standley says that it is found in thickets of the "tierra caliente". He also makes the comment that "Like other varieties assigned to this species, this appears to be a form of scant systematic importance." The common names "morcielago", "murcielago", and "murciélago" have been recorded.

The Tonduz s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 11507] collection cited on page 171 of my monograph (1936) as from "Province undetermined" is actually from Cartago, Costa Rica.

Additional citations: COSTA RICA: Alajuela: Brenes 13623 [17; 283; 14193] (N). Cartago: F. L. Stevens 385 (Ur); Tonduz 11507 (Mu--3784), s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 11507] (Br, Br). Guanacaste: Brenes 12329, in part [208] (N). Puntarenas: Cufodontis 203 (V); Holm & Iltis 276 (N); Pittier s. n. [Herb. Inst. Physico-geogr. Nat. Costaric. 11979] (Br, X); Tonduz 4512 (Br, Br). San José: Skutch 2642 (E--1110677, Mi, N, S), 4883 (W--1791322). Province undetermined: Tonduz 237 bis [Piedra Blanca] (X, X, X). PANAMA: Canal Zone: Paul 473 (Mi, N); Seibert 113 (E--1115312); Stern, Chambers, Dwyer, & Ebinger 56 (Z). Chiriquí: P. H. Allen 5034 (E); Wagner s.n. (Mu--1041); Woodson, Allen, & Seibert 412 (N). Coclé: P. H. Allen 1635 (N), 1795 (N); Woodson, Allen, & Seibert 1737 (N, N). Panamá: C. W. Dodge s.n. [Chepo, June 14, 1936] (F--892201); F. L. Stevens 610 (Ur); Woodson, Allen, & Seibert 758 (N, N); Woodson & Schery 1002 (N). Province undetermined: Hayes s.n. (Ed). PEARL ISLANDS: San José Island: C. O. Erlanson 311 (Du--349974, N). Island undetermined: Andersson s.n. [1852] (S, S). CULTIVATED: Costa Rica: Brenes 12329, in part [208; 808] (F--856036).

CORNUTIA GRANDIFOLIA var. PURPUSI Moldenke

Synonymy: Hosta longifolia H.B.K., Nov. Gen. & Sp. Pl. 2: 247. 1818. Hosta longifolia Humb. & Bonpl. ex Steud., Nom. Bot., ed. 1, 414. 1821. Cornutia longifolia (H.B.K.) Spreng., Syst. Veg. 1: 39. 1825. Hosta longifolia Kunth ex Schau. in A. DC., Prodr. 11: 682, in syn. 1847. Hosta longifolia Humb. ex Moldenke, Prelim. Alph. List Invalid Names 28, in syn. 1940. Cornutia pyramidata var. longifolia (H.B.K.) Kuntze, Rev. Gen. Pl. 2: 506.

1891. Cornutia grandifolia var. purpusii Moldenke apud Matuda, Am. Midl. Nat. 44: 576, sphalm. 1950.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 247. 1818; Steud., Nom. Bot., ed. 1, 444. 1821; Spreng., Syst. Veg. 1: 39. 1825; Steud., Nom. Bot., ed. 2, 1: 422 & 776. 1840; Schau. in A. DC., Prodr. 11: 682. 1847; Kuntze, Rev. Gen. Pl. 2: 506. 1891; Jacks., Ind. Kew. 1: 1176. 1893; Moldenke in Fedde, Repert. 40: 161, 169, 195, 196, & 200--204. 1936; Moldenke, Geogr. Distrib. Avicenn. 14. 1939; Moldenke, Prelim. Alph. List Invalid Names 23, 24, & 28. 1940; Moldenke, Suppl. List Invalid Names 11. 1941; Moldenke, Alph. List Invalid Names 22 & 26. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16 & 92. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 77. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 184. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Moldenke, Résumé 35, 275, 276, 300, & 454. 1959.

Collectors describe this variety as a tall tree, 15 m. tall, or only shrubby and 2 m. tall, to 45 cm. in diameter. It has been found in woods at an altitude of 1000 m., fruiting in September. The MacDaniels 837 cited below is in fruit, but probably represents this variety.

The type of Hosta longifolia, not seen by me when my monograph was published (1936), has since been examined by me. It proves to be identical with this variety. Therefore the name Cornutia longifolia can now be removed from the list of "species dubiae" and placed in synonymy here.

Additional citations: MEXICO: Chiapas: Matuda 17872 (N, N). Oaxaca: Ghiesbreght s.n. [Oaxaca, 1843] (P). Vera Cruz: Botteri 1091 (B, P); Botteri & Sumichrast 1388 (P); Bourgeau 2504 (Br, Br, P, P, P); Galeotti 757 (Br, Br); Ghiesbreght 7 (P); MacDaniels 837 (Ba); Purpus 4445 (Ed), s.n. [Cosalapa, May 1922] (Du--191879). LOCALITY OF COLLECTION UNDETERMINED: Bonpland s.n. (P).

CORNUTIA GRANDIFOLIA var. QUADRANGULARIS Ørst. & Moldenke

Additional synonymy: Cornutia grandifolia var. quadrangularis (Oerst.) Moldenke apud Standl., Field Mus. Publ. Bot. 18: 1004. 1938.

Literature: Moldenke in Fedde, Repert. 40: 160, 168, 200, & 203. 1936; Standl., Field Mus. Publ. Bot. 18: 1004--1005. 1938; Moldenke, Alph. List Common Names 24. 1939; Moldenke, Geogr. Distrib. Avicenn. 17. 1939; Moldenke, Prelim. Alph. List Invalid Names 24. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23 & 92. 1942; Moldenke, Alph. List Invalid Names 22. 1942; Moldenke, Phytologia 2: 102. 1944; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39 & 184. 1949; Moldenke, Résumé 46, 275, 276, & 454. 1959.

CORNUTIA GRANDIFOLIA var. STORKII Moldenke

Literature: Moldenke in Fedde, Repert. 40: 161, 169--170, 200, & 204. 1936; Standl., Field Mus. Publ. Bot. 18: 1005. 1938; Mol-

denke, Geogr. Distrib. Avicenn. 17. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23 & 92. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 84. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39 & 184. 1949; Moldenke, Résumé 46 & 454. 1959.

Standley describes this variety as a shrub or tree, 7 m. or less in height, found at 1680 m. altitude.

CORNUTIA JAMAICENSIS Moldenke

Literature: Moldenke in Fedde, Repert. 40: 160, 191--193, 200, & 202. 1936; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 92. 1942; E. J. Salisbury, Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 184. 1949; Moldenke, Résumé 55 & 454. 1959.

Proctor describes this species as a small bushy tree, 5 m. tall, with violet flowers in May, growing on wooded limestone hillsides at altitudes of 2300 to 2500 feet.

Additional citations: JAMAICA: G. R. Proctor 19689 (N).

CORNUTIA LATIFOLIA (H.B.K.) Moldenke

Corrected synonymy: Hosta latifolia H.B.K., Nov. Gen. & Sp. Pl. 2: 248. 1818 [not H. latifolia (Miq.) Matsum., 1905]. Hosta latifolia Humb. & Bonpl. ex Steud., Nom. Bot., ed. 1, 414. 1821.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 248. 1818; Steud., Nom. Bot., ed. 1, 414. 1821; Spreng., Syst. Veg. 1: 39. 1825; Steud., Nom. Bot., ed. 2, 1: 422 & 776. 1840; Jacks., Ind. Kew. 1: 1176. 1893; Millsp., Field Columb. Mus. Publ. Bot. 1: 316. 1896; Matsum., Ind. Pl. Jap. 2 (1): 200. 1905; Moldenke in Fedde, Repert. 40: 161, 179--181, 198, & 200--205. 1936; Lundell, Carnegie Inst. Wash. Publ. 478: 138 & 183. 1937; Moldenke, Alph. List Common Names 19 & 21. 1939; Moldenke, Geogr. Distrib. Avicenn. 14, 15, & 38. 1939; Moldenke, Carnegie Inst. Wash. Publ. 522: 205--206. 1940; Moldenke, Suppl. List Common Names 6 & 13. 1940; Moldenke, Prelim. Alph. List Invalid Names 23 & 28. 1940; Moldenke, Alph. List Invalid Names 22 & 26. 1942; Steere, Contrib. Univ. Mich. Herb. 8: 61. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16, 20, 21, 73, & 92. 1942; Moldenke, Phytologia 2: 102. 1944; E. J. Salisbury, Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29, 35, 36, 160, & 184. 1949; Moldenke, Résumé 35, 41, 43, 218, 276, 300, & 454. 1959.

This plant is said to be a shrub, with stems to 15 cm. in diameter, found in second growth, in mahogany forests, and, according to the Lundells, "in dooryards and along streets, rare". The corolla is described as purplish or bluish-purple. The species has been collected in flower also in May, and in fruit in July. O'Neill 8747 exhibits dentate leaves exactly like those seen on some specimens of C. pyramidata var. isthmica, but has the large calyxes of C. latifolia. The collector says that it is boiled with oil and honey and used in the treatment of asthma.

The Hosta latifolia (Miq.) Matsum. referred to on page 198 of

my monograph (1936) as H. miquelii Moldenke should actually be reduced, according to Stearn, to H. ventricosa (Salisb.) Stearn. Steudel (1840) places Hosta latifolia H.B.K. in the synonymy of Cornutia pyramidata L.

Additional citations: MEXICO: Chiapas: Matuda 3807 (F—1028148, Mh). Tabasco: Matuda 3398 (F—1028209, Mh, N). Yucatán: Lundell & Lundell 7888 (Du—363078, Mi, Mi, N); Steere 1458 (La, N), s.n. (Me); E. C. Stewart 83 (Mi). BRITISH HONDURAS: Gentle 16 (N), 186 (N); O'Neill 8747 (I, Mi). CULTIVATED: Cameroons: Herb. Bot. Gart. Victoria 67 (B).

CORNUTIA LATIFOLIA f. ALBA Moldenke

Literature: Moldenke, Phytologia 2: 131. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29 & 184. 1949; Moldenke, Résumé 35 & 454. 1959.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by William Campbell Steere, without number, in chaparral at Champotón, Campeche, Mexico, in July, 1932, and is deposited in the herbarium of the Instituto Biología at Mexico City.

Citations: MEXICO: Campeche: Steere s.n. [July 1932] (Me—type).

CORNUTIA LILACINA Moldenke

Literature: Moldenke in Fedde, Repert. 40: 160, 181—183, 200, & 201. 1936; Moldenke, Geogr. Distrib. Avicenn. 15 & 16. 1939; Calderón & Standl., Fl. Salvador., ed. 2, 237. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20, 21, & 92. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 35, 37, 38, & 184. 1949; Moldenke, Résumé 41, 44, 45, & 454. 1959.

This species is often found misidentified in herbaria as "C. grandifolia Schau." or as C. pyramidata L. Calderón & Standley, in the reference listed above (1941), under the designation of C. pyramidata, list the vernacular name "zapalote" for this plant. Skutch erroneously refers to the fruit as a "berry".

Collectors report that the species is a shrub, about 2.5 m. tall, or a small tree, to 13 m. tall, the trunk to 30 cm. in diameter at breast height; leaves membranous or firmly membranous, malodorous, pungent, dull rich-green above when fresh, pale-green beneath, with grayish-white to dull-rose midribs; corolla purple, with a pale-yellow spot at the base of the lower lip, or lilac-lavender, deeper purple in the center, with 2 buff-yellow spots below the center; fruit purple.

It has been collected in woods, on brushy slopes and brushy hillsides, and in moist thickets between the pine and cloud forests, not frequent, at altitudes of 100 to 1500 m., blooming also in March and September, and fruiting in October.

Additional citations: GUATEMALA: Chiquimula: Steyermark 30338 (F—1056510), 30769 (F—1051030). Quezaltenango: Skutch 1326 (F—

934268, N). San Marcos: Steyermark 37427 (F--1058761). Zacapa: C. C. Deam 6383 (Vt--isotype). HONDURAS: Yoro: J. B. Edwards P.648 (B).

CORNUTIA LILACINA var. *VELUTINA* Moldenke

Literature: Moldenke in Fedde, Repert. 40: 160, 183, 200, & 201. 1936; Moldenke, Geogr. Distrib. Avicenn. 16. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 21 & 92 (1942) and [ed. 2], 37 & 184. 1949; Moldenke, Résumé 41, 44, & 454. 1959; Moldenke, Résumé Suppl. 1: 3. 1959.

This is said to be a tree 12--20 feet tall, with deep-lavender, blue, deep-violet, or purple flowers, blooming in June, September, and November, growing on wooded slopes at altitudes of 800 to 1175 meters. Material has often been misidentified in herbaria as typical *C. lilacina* Moldenke or as *C. pyramidata* L. Allen describes the plant as "infrequent".

Additional citations: GUATEMALA: Sololá: Steyermark 48047 (N). HONDURAS: Comayagua: J. B. Edwards 0.385 (B--isotype). Morazán: Glassman 1798 (N, Ok, Ur, Ur); P. C. Standley 21618 (N), 22489 (N). EL SALVADOR: Sonsonate: P. H. Allen 7073 (N); Allen & Van Severen 6923 (N).

CORNUTIA MICROCALYCINA Pavon & Moldenke

Additional synonymy: *Cornutia microcalycina* Pavon ex Standl., Field Mus. Publ. Bot. 18: 1005. 1938. *Cornutia grandifolium* Linden ex Moldenke, Suppl. List Invalid Names 3, in syn. 1941.

Literature: Moldenke in Fedde, Repert. 40: 161, 173--175, & 200--205. 1936; Standl., Field Mus. Publ. Bot. 18: 1005. 1938; Moldenke, Geogr. Distrib. Avicenn. 19, 20, 22, & 23. 1939; Moldenke, Prelim. Alph. List Invalid Names 28. 1940; Moldenke, Suppl. List Invalid Names 3. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, 34, & 92. 1942; Moldenke, Alph. List Invalid Names 22 & 26. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 63, 69, 72, & 184. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 6. 1949; Moldenke, Résumé 66, 70, 79, 82, 275, 300, & 454. 1959.

Collectors describe this species as a shrub, 2.5--6 m. tall, a tree to 20 m. tall, or even as "a vine on tree"; leaves buff gray-green beneath, dark dull-green above, the pubescence composed of buff-yellowish hairs; rachids, calyxes, and corollas purple, or the corollas blue, lavender, lilac, light-lilac, or purple-lilac, sometimes deeper lavender on the lobes; young fruit green.

Standley says "Differing from *C. grandifolia* in having the branches and the rachis of the inflorescence pilose, puberulent, or subglabrate, rather than densely short-pubescent; perhaps only a variety of that species."

It has been found in rich, moist, luxuriant forests, on shady rivulet-shores in forests, in secondgrowth forests, fields, and open pastures, at 975 to 1800 meters altitude, flowering in Feb-

ruary, April, June, August, and October. The vernacular name "nacedero" has been recorded.

Additional citations: PANAMA: Darien: Stern, Chambers, Dwyer, & Ebinger 471 (Z). COLOMBIA: Antioquia: Toro Toro 1323 (Fn). Chocó: A. Fernandez 292 (W--1997958). VENEZUELA: Barinas: Aristeguieta 3255 (N). Lara: Linden 1457 (Cb, F--869561, P). Mérida: Steyermark 56134 (F--1205136, N). ECUADOR: El Oro: Asplund 18155 (S); Steyermark 54236 (N); Wiggins 10924 (N). Guayas: Asplund 5734 (S), 15400 (S); Fagerlind & Wibom 632 (S). PERU: Department undetermined: Pavon s.n. [1827] (P).

CORNUTIA MICROCALYCINA var. ANOMALA Moldenke

Literature: Moldenke in Fedde, Repert. 40: 160, 176, 200, 202, & 203. 1936; Standl., Field Mus. Publ. Bot. 18: 1005. 1938; Moldenke, Geogr. Distrib. Avicenn. 17 & 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23 & 92 (1942) and [ed. 2], 40 & 184. 1949; Moldenke, Résumé 47, 48, 66, & 454. 1959.

Collectors report the corolla as purple. The plant has been found growing at 800 meters altitude, blossoming in November. Standley says "Differing from the species in having the pubescence of the leaves denser and of long, white, lustrous, multicellular hairs which are appressed on the upper surface and more or less matted beneath." Actually, it differs from the typical form of the species in the pubescence on the upper and lower leaf-surfaces being densely or lightly long-pubescent, -pilose, or -villous with long, white, glistening, multicellular hairs, which are strigosely appressed above and subtomentose beneath.

Additional citations: COLOMBIA: Caldas: Sneidern 5061 (F--1302017, N). COCOS ISLAND: Pittier s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 16254] (B); A. Stewart 318 (Gg--31061--isotype).

CORNUTIA MICROCALYCINA var. PULVERULENTA Moldenke

Literature: Moldenke in Fedde, Repert. 40: 155, 161, 175--176, & 200--204. 1936; Moldenke, Geogr. Distrib. Avicenn. 18, 19, & 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23, 31, 34, & 92. 1942; Moldenke, Castanea 10: 41. 1945; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 40, 59, 69, & 184. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 6. 1949; Moldenke, Mem. N. Y. Bot. Gard. 9: 176. 1955; Moldenke, Résumé 48, 66, 79, 275, & 454. 1959.

Collectors describe this plant as a coarse much-branched shrub or small tree, 3--12 meters tall; trunk about 10 cm. in diameter at breast height; stems reddish; primary branches often arching; secondary branches erect until too heavy; leaves herbaceous, gray-green or light-green above and paler beneath; flowers very odorous; corolla blue or deep-blue to lilac or light-violet, rarely white; fruit juicy, purple or white; seeds angular, verrucose, nigrescent-purple.

A common name recorded for the plant is "culape". The plant is

said to be common in pastures, forests, rainforests, and open llanos, at altitudes from sea-level to 410 meters.

Dryander 2543 is said by the collector to have white flowers, while Camp E.3681 is said to have had white fruit (but the corolla deep-blue). Possibly these two collections deserve distinct form names. The Sodiro 125/23 from Puente de Chine, cited on page 176 of my monograph (1936) as from "Province undetermined", is probably from Chimborazo, Ecuador. The type of the variety was collected on the playas along the Río Timbiquí, in El Cauca, Colombia.

Additional citations: COLOMBIA: Antioquia: Metcalf & Cuatrecasas 30194 (Ca--687225). El Cauca: F. C. Lehmann 9018 (V--iso-type). Nariño: Dryander 2543 (N), 2582 (Ci). Valle del Cauca: Cuatrecasas 17628 (N). ECUADOR: Esmeraldas: E. L. Little 6291 [U. S. Forest Serv. 96778] (It, N). Guayas: Cañar, Chimborazo, & Bolívar: Camp E.3681 (N). Los Ríos: Asplund 5504 (N, S).

CORNUTIA OBOVATA Urb.

Literature: Urb., Symb. Antil. 1: 395. 1899; Thiselet.-Dyer, Ind. Kew. Suppl. 2: 48. 1904; Moldenke in Fedde, Repert. 40: 160, 188--189, 199, & 204. 1936; Moldenke, Geogr. Distrib. Avicenn. 8. 1939; Moldenke, Alph. List Common Names 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 27 & 92. 1942; Moldenke, Phytologia 2: 102. 1944; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 49 & 184. 1949; Moldenke, Résumé 58 & 454. 1959.

Collectors describe this species as having a trunk 10--20 cm. in diameter at breast height; leaf-blades varying from broadly elliptic to obovate, to 15 cm. long and 11.8 cm. wide; the inflorescences to 30 cm. long and 6 cm. wide.

A flowering collection now being available, the following characters may be added to the specific description: calyx campanulate, about 3.9 mm. long and 4.6 mm. wide, densely appressed-puberulent, its rim deeply 4-lobed, the lobes about 2.5 mm. long, blunt at the apex; corolla hypocrateriform, its tube 6.8--7.3 mm. long, about 2.4 mm. wide at the base, ampliate to 3 mm. at the middle, densely puberulent outside, densely villous among the stamens within, the limb 2-lipped, 4-lobed, appressed-puberulent throughout (except the upper half of the inner surface of the abaxial lobe), the abaxial lobe oblong-quadrate, about 6.8 mm. long and 5.8 mm. wide, venose, crisped, emarginate at the apex, the 3 adaxial lobes triangular-ovate, 3.9--4.4 mm. long, 2.9--5 mm. wide, subacute at the apex; 2 fertile stamens inserted about 5.8 mm. above the base of the corolla-tube, exserted; filaments about 5.8 mm. long, pilose; style about 7.5 mm. long, densely strigose, curvate at the apex; stigma bifid, its branches flattened, widest at the base and tapering gradually to the apex, about 0.5 and 0.7 mm. long respectively; disk glabrous, truncate above; ovary subglobose, about 1.9 mm. long and wide, densely villous with canescent antrorse hairs; fruiting-calyx with the rim entire or rather deeply lobed.

The species has been found in flower and fruit in September.

Holdridge says that it is found in the limestone section of Puer-
to Rico, growing by old dwellings, said to be perhaps introduced
and "not the same as our 2 native species" [actually, C. pyrami-
data L. is the only other native species known from the island].
The common names "nigua" and "palo de nigua" have been recorded
for it. Its rather deeply lobed calyx and fruiting-calyx change
its position in the key to species as published in my monograph
(1936).

Additional citations: PUERTO RICO: L. E. Gregory 10 (N), 154
(N); Sintenis 2022 (Cb--isotype, Lu--isotype, Mu--3770--isotype,
P--isotype, Vu--isotype).

CORNUTIA ODORATA (Poepp. & Endl.) Poepp.

Literature: Poepp. & Endl., Nov. Gen. & Sp. Pl. 3: 63, pl. 269.
1845; Schau. in A. DC., Prodr. 11: 681. 1847; Jacks., Ind. Kew.
1: 619. 1893; Stapf, Ind. Lond. 3: 443. 1930; Moldenke in Fedde,
Repert. 40: 161, 176--178, 200, 202, 203, & 205. 1936; Moldenke,
Geogr. Distrib. Avicenn. 22 & 23. 1939; Moldenke, Alph. List Com-
mon Names 11 & 32. 1939; Moldenke, Prelim. Alph. List Invalid
Names 23, 24, 28, & 52. 1940; Moldenke, Known Geogr. Distrib.
Verbenac., [ed. 1], 34, 35, & 92. 1942; Moldenke, Alph. List In-
valid Names 22, 26, & 55. 1942; Moldenke, Phytologia 2: 102.
1944; Svenson, Am. Journ. Bot. 33: 419 & 480. 1946; E. J. Salisb.,
Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib.
Verbenac., [ed. 2], 69, 72, & 184. 1949; Moldenke, Résumé 79,
82, 218, 275, 276, 300, 389, & 454. 1959.

Illustrations: Poepp. & Endl., Nov. Gen. & Sp. Pl. 3: pl. 269.
1845.

Collectors describe this plant as a bush, tall shrub, or tree,
1.5--8 m. tall; leaves strongly and pleasantly aromatic, used in
infusions against rheumatic pains; flowers in large panicles,
with a strong smell of lavender (Lavandula spica L.); corolla
varying from pale-violet, violet, or dark-violet to violet-blue,
blue, or lilac-purple. It has been collected in anthesis also in
March, April, and September, and has been found in forests, at
the edge of woods, in clearings, and along streambanks, from 100
to 650 meters altitude. Additional common names are "tál" and
"ulape".

Additional citations: ECUADOR: Esmeraldas: Mexia 8497 (F--
1011544, Go, N, S). Guayas: Heilborn 116 (S, S, S, S, S); Sven-
son 11455 (J). Los Ríos: Harling 230 (S), 375 (S). Napo-Pastaza:
Asplund 8935 (S); Benoist 4738 (P, S); Fagerlind & Wibom 2335
(S), 2335-II (S); Mexia 7131 (N, W--1592024). Oriente: Heinrichs
340 (Mu, N). Province undetermined: Benoist 38 (P). PERU: Loreto
Klug 394 (F--623979), 1478 (N, W--1456405), 2159 (B, S); Poeppig
2448 [826; Macbride photos 7885] (Dc--isotype, Kr--photo of
type, N--photo of type, P--isotype, P--isotype); Ll. Williams
8223 (F--623344). San Martín: Klug 4004 (Ca--709754, E--1111166,
F--853130, Gg--248407, I, N, S). CULTIVATED: Peru: Ducke s.n.
[Herb. Rio de Jan. 22570] (B).

CORNUTIA ODORATA var. CALVESCENS Moldenke

Literature: Moldenke, Brittonia 1: 470--471 & 474. 1934; Moldenke in Fedde, Repert. 40: 161, 179, 200--202, 204, & 205. 1936; Moldenke, Phytologia 1: 234. 1937; Moldenke, Geogr. Distrib. Avicenn. 19. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31 & 92 (1942) and [ed. 2], 59 & 184. 1949; Moldenke, Résumé 66 & 454. 1959.

Collectors describe this plant as a tree 6.5 m. tall, with dark-green leaves and blue-purple flowers. It has been collected in the semi-shade of forests, at 800 to 1900 meters altitude, flowering in February and September.

It seems most probable that Aegiphila macrophylla H.B.K. is a synonym of Cornutia odorata var. calvescens. The specimen labeled "Aegiphila macrophylla" from Bonpland's own herbarium at Berlin, mentioned by me on pages 470--471 of my Aegiphila monograph (1934), proves to be this variety. It does not, however, agree in all respects with Kunth's original description.

Additional citations: COLOMBIA: Antioquia: Toro Toro 1280 (Fn). Caldas: Sneider 5061 (S), 5232 (F--1299865, S), 54321 (N). Magdalena: C. Allen 734 (E--1015222).

CORNUTIA ODORATA var. COLOMBIANA Moldenke

Synonymy: Cornutia adorata var. colombiana Moldenke apud F. A. Barkley, Determinac. Ejemp. Herb. Fac. Nac. Agron. Medellin 2 (1): 14, sphalm. 1950.

Literature: Moldenke in Fedde, Repert. 40: 161, 178--179, & 200--205. 1936; Moldenke, Geogr. Distrib. Avicenn. 19. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31 & 92 (1942) and [ed. 2], 59 & 184. 1949; F. A. Barkley, Determinac. Ejemp. Herb. Fac. Nac. Agron. Medellin 2 (1): 14. 1950; Moldenke, Résumé 66 & 454. 1959.

This plant is described by collectors as a coarse herb, 1.8 m. tall, or an aromatic shrub or small tree, 2--8 m. tall; trunk to 5 cm. in diameter at breast height; bark gray, smooth; stems square in cross-section; leaves aromatic; buds greenish-white; inflorescence terminal, large; corolla blue, dark-blue, or very dark-blue to blue-lilac, violet, or purple; fruit purple, conspicuous.

It has been collected in moist soil near rivers, in weedy thickets, in secondgrowth forests, and in brushy secondgrowth vegetation on soil formed of decomposed sedimentary rock, at altitudes of 70 to 2000 meters. It has been collected in anthesis also from March to June and November to January, and in fruit in December. Herbarium specimens have been misidentified as Salmea sp.

Additional citations: COLOMBIA: Antioquia: Scolnik, Araque Molina, & Barkley 19An527 (N). Caldas: Haught 2130 (N); M. Schneider 1032 (S). Chocó: Killip 35496 (W--1772205). Cundinamarca: Cuatrecasas 9372 (W--1795881); García y Barriga 7671 (W--1744962); Haught 6066 (N); Triana 2068 [Macbride photos 34305] (Ed--iso-

type, F--976285--photo of type, Kr--photo of type, N--photo of type, P--isotype). Huila: Fosberg 19818 (W--2059692); E. L. Little 7929 (N, N). Méta: Cuatrecasas 4698 (W--1773530). Tolima: García y Barriga 8310 (W--1774152); Goudot s.n. [Ibagué] (P); Lehmann B.T.1108 (V). Valle del Cauca: Cuatrecasas 23982 (F--1341683).

CORNUTIA PUBESCENS Gaertn. f.

Additional synonymy: Cornutia cajenensis Schau. ex Moldenke, Prelim. Alph. List Invalid Names 23, in syn. 1940.

Literature: Gaertn. f., Fruct. 3: pl. 213. 1807; Steud., Nom. Bot., ed. 1, 228 (1821) and ed. 2, 1: 422. 1840; Bocq., Adansonia 3: [Rev. Verbenac.] 137, pl. 12. 1863; Jacks., Ind. Kew. 1: 619. 1893; Stapf, Ind. Lond. 2: 301. 1930; Moldenke in Fedde, Repert. 40: 159, 162--163, & 200--203. 1936; Moldenke, Geogr. Distrib. Avicenn. 22 & 39. 1939; Moldenke, Prelim. Alph. List Invalid Names 23. 1940; Moldenke, Alph. List Invalid Names 22. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 73, & 92 (1942) and [ed. 2], 68, 160, & 184. 1949; Moldenke, Résumé 78, 218, 275, & 454. 1959.

Illustrations: Gaertn. f., Fruct. 3: pl. 213. 1807; Bocq., Adansonia 3: [Rev. Verbenac.] pl. 12. 1863.

Some herbarium specimens of this plant have been misidentified by herbarium workers as Aegiphila sp. The species is apparently closely related to C. obovata Urb. of Puerto Rico.

Additional citations: FRENCH GUIANA: Collector undesignated 356 (P), 956 (Us); Herb. Sagot s.n. (P); Leblond 280 (P); Leprieur s.n. [1838] (P, P), s.n. [1840] (Dc); Martin 38 (P); Perrotet 223 (Dc), s.n. [1820] (Dc, Dc, Dc), s.n. [1821] (P). CULTIVATED: French Guiana: Sagot s.n. [Jardin de Baduet, 1859] (P).

CORNUTIA PYRAMIDATA L.

Additional and corrected synonymy: Cornutia pyramidata Willd. ex A. Dietr. in Willd., Sp. Pl. 1: 253. 1831 [not C. pyramidata Ait., 1789, nor Spreng., 1825]. Aegiphila acutangula Widgren ex Moldenke, Brittonia 1: 471, in syn. 1934. Calychirichibou carafinaeorum Surian. ex Moldenke, Prelim. Alph. List Invalid Names 14, in syn. 1940. Cornutia pyramidalis L. ex Moldenke, Prelim. Alph. List Invalid Names 23, in syn. 1940. Cornutia pyramidata var. tomentosa L. C. Rich. ex Moldenke, Prelim. Alph. List Invalid Names 24, in syn. 1940. Cornutia pyramidata León ex Roig, Dicc. Bot. 2: 1012. 1953.

Literature: Plum., Nov. Pl. Amer. Gen. 32, pl. 17. 1703; Vaill., Hist. Acad. Roy. Sci. (Gall.) 1722: 201. 1724; L., Hort. Cliff. 319. 1737; L., Sp. Pl., ed. 1, 628. 1753; Plum., Pl. Amer., ed. Burm., pl. 10, fig. 1. 1757; Medic., Beobacht. 112. 1783; Jacq., Hort. Schönbr. 1: 60, pl. 114. 1797; Lam., Tabl. Encycl. Méth. 3: pl. 541. 1797; Steud., Nom. Bot., ed. 1, 228 & 414.

1821; Mordant de Launay, Herb. Amat. 8: pl. 505. 1827; Willd., Sp. Pl. 1: 253. 1831; Drapiez, Herb. Amat. Fl. 8: pl. 538. 1835; Steud., Nom. Bot., ed. 2, 1: 422 & 776. 1840; Walp., Repert. 4: 80. 1844; Schau. in A. DC., Prodr. 11: 681. 1847; Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 257. 1857; Jacks., Ind. Kew. 1: 619. 1893; Gerth van Wijk, Dict. Plantnames 1: 372--373 (1911) and 2: 21, 176, 178, & 185. 1916; Urb. in Fedde, Repert. Beih. 5: 60. 1920; Britton & P. Wils., Scient. Surv. Porto Rico 6: 148--149. 1925; Salvador Minist. Instrucc. Publ., Fl. Salvad. 1: pl. 82. 1926; Seymour, Host Ind. Fungi N. Am. 588--589. 1929; Stapf, Ind. Lond. 2: 301. 1930; Junell, Symb. Bot. Upsal. 4: 90 & 91, fig. 137--139. 1934; Moldenke, Brittonia 1: 471. 1934; Moldenke in Fedde, Repert. 40: 160, 183--187, & 199--205. 1936; Lundell, Carnegie Inst. Wash. Publ. 478: 75. 1937; Moldenke, Lilloa 4: 333. 1939; Moldenke, Geogr. Distrib. Avicenn. 5--8, 10, 11, & 39. 1939; Moldenke, Alph. List Common Names 1, 5, 6, 12, 22, 24, & 25. 1939; Moldenke, Carnegie Inst. Wash. Publ. 522: 204--207. 1940; Moldenke, Prelim. Alph. List Invalid Names 1, 4, 14, 23, 24, & 27. 1940; Worsdell, Ind. Lond. Suppl. 1: 256. 1941; Moldenke, Alph. List Invalid Names 1, 4, 11, 22, 26, & 27. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25--29, 73, & 92. 1942; Moldenke, Phytologia 2: 102. 1944; Beard, Journ. N. Y. Bot. Gard. 47: 239. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 43, 46, 47, 49, 53--56, 160, & 184. 1949; Roig, Dicc. Bot. 1: 849 and 2: 1012. 1953; Alain in León & Alain, Fl. Cuba 4: 313 & 314, fig. 135. 1957; Moldenke, Résumé 51, 55, 56, 58, 60, 61, 77, 218, 228, 232, 248, 275, 276, 299, 300, 425, & 454. 1959; Moldenke, Résumé Suppl. 1: 4. 1959.

Illustrations: Plum., Nov. Pl. Amer. Gen. pl. 17. 1703; Plum., Pl. Amer., ed. Burm., pl. 10, fig. 1. 1757; Lam., Tabl. Encycl. Méth. 3: pl. 541. 1797; Mordant de Launay, Herb. Amat. 8: pl. 505 (in color). 1827; Drapiez, Herb. Amat. Fl. 8: pl. 538 (in color). 1835; Salvador Minist. Instrucc. Publ., Fl. Salvad. 1: pl. 82. 1926; Junell, Symb. Bot. Upsal. 4: fig. 137--139. 1934; Alain in León & Alain, Fl. Cuba 4: fig. 135. 1957.

Collectors describe this plant as a shrub or small tree, 2--10 m. tall; trunk about 15 cm. in diameter; bark resembling that of *Ostrya virginiana* (Mill.) K. Koch; leaves succulent, the margins sometimes all coarsely serrate on sterile shoots (e.g., Morton 4760); inflorescence conspicuous in August; corolla blue, dull-blue, or lilac; fruit blue.

The wood is used for pillar trees, and the seeds make a purple ink. The species has been collected in open pastureland underlaid with red clay, in thickets, coastal thickets, and thickets on serpentine, and common in the forest of arid zones. Egler reports it as "common in the fire-conditioned grassland-scrub mosaic north of Pte. Caracoli." Recent specimens have been collected in anthesis in February, April to August, November, and December. It is said to be rather common in the Dominican Republic.

Additional common names recorded for it are "agnanthe à fleurs

en grappe", "agnanthe à fleurs en grappes", "bois à côtelettes", "bois cac", "bois côtelet", "bois côtelet quarré", "bois de caque", "bois de savane", "bois de savanne", "bois guarri", "bois pou-poule", and "salvilla". It is worthy of note that the name "bois côtelet" is applied also to Citharexylum spinosum L., and "bois de savane" is applied also to Vitex heptaphylla A. L. Juss. Likewise, the name "fiddlewood" recorded for this species in my monograph (1936) is applied also to Citharexylum fruticosum var. brittonii Moldenke, C. fruticosum var. villosum (Jacq.) O. E. Schulz, C. spinosum L., Petitita domingensis Jacq., Vitex gaumeri Greenm., and V. umbrosa Sw., while the name "penda" is applied as well to Citharexylum caudatum L., C. fruticosum L., C. fruticosum var. subvillosum Moldenke, C. fruticosum var. villosum (Jacq.) O. E. Schulz, and C. spinosum L. The name "salvilla" is also applied to Rhytidophyllum tomentosus (L.) DC. in the Gesneriaceae.

Steudel (1840) includes Hosta latifolia H.B.K. in the synonymy of Cornutia pyramidata, while Drapiez (1835) includes C. punctata Willd. Both reductions are erroneous.

Linnaeus, in his original description of the species in the Species Plantarum, ed. 1, page 628 (1753), says:

pyramidata. 1. CORNUTIA. Hort. cliff. 319.

Cornutia flore pyramidato foliis incanis.

Plum. gen. 32.

Agnanthus viburni folio. Vaill. act. 1722, p. 273.

Habitat in Caribaeis, Campechia. †

It is to be noted that he thus bases the species on a West Indian and a Mexican specimen. I consider that the Mexican plant must be either C. pyramidata var. isthmica Moldenke or C. latifolia (H.B.K.) Moldenke. In the Linnean Herbarium in London, under genus 784, Cornutia, specimen number "1" is labeled "pyramidata" in Linnaeus' own handwriting and certainly is what we now regard as this species in its true form. According to his publication cited above, however, the actual type should be a specimen in the Hortus Cliffortianus herbarium, page 319, preserved at the British Museum. Search reveals the fact that it is not there, but there is a note stating that it was incorporated in the general herbarium of that institution, where it is also not now to be found. I am therefore assuming that it has become lost, and so am designating the specimen in the Linnean Herbarium as the logotype of the species.

Additional citations: CUBA: Oriente: Acuña 12704 (Es, W--1881258); G. C. Bucher 1003 [Herb. Roig 7588] (Es), 10556 (Es); Mrs. G. C. Bucher 143 (N), 11765 (Es); Ekman 3425 (N); R. A. Howard 5928 (N, N, Um--47672); León 11841 (Ha), 11848 (Ha); León, Clément, & Alain 22498 (Ha, N); León, Victorin, & Alain 19763 (Ha, N, N); Marie-Victorin, Clément, & Alain 21549 (Um--42771, Um--42772), 21757 (Um--25223); Matos s.n. [León 19646] (Ha, N, N);

Victorin & Alain 21549 (Ha, N), 21757 (Ha, N). Province undetermined: C. Wright 3178 [1860—64; Herb. Sauvalle 1782] (Hv, Hv, P). JAMAICA: Tussac s.n. [1807; Herb. Jussieu 5079] (P). HISPANIOLA: Dominican Republic: Abbott 1452 (B), 2558 (B); Bertero s.n. [S. Domingo] (Dc); Eggers 1538 (P, Vu); Ekman H.10893 (B, Ca—608040, N), H.12464 (B, F—839501, Mi); Fuertes 102 (Ed, Lu, P); Howard & Howard 9909 (N); Rob. Schomburgk 126 (P). Haïti: Collector undesignated s.n. (P). PUERTO RICO: Eggers 426 [Herb. Prager 186713] (Br, Gg—31062, Mu—1710, P, Vu). LEEWARD ISLANDS: Dominica: W. H. Hodge 869 (Du—359136, Gg—310911, N, S); R. A. Howard 11749 (N); Kraus 245 (Ed); D. Taylor 19 (Oa—10485). Guadeloupe: Duss 302 (P); Quentin 33 (P); L. C. Richard s.n. [Guadeloupe] (P), s.n. [Montabo] (P), s.n. [Praedii d'un Bourda] (P); Stehlé 241 (N), 467 (S). WINDWARD ISLANDS: Grenada: P. Beard 1244 (N, S); Eggers 6296 (Mu—1711, P, Vu). Martinique: Bélanger 295 (P); Egler 39-240 (N); Hahn 580 (P), 899 (Br, Br, P, P), 899a (Br), 1066 (P), s.n. (V); Plée 3 (P); L. C. Richard s.n. [Martinique] (P); Sieber Fl. Mart. 158 (B, Br, Mu, P). St. Lucia: J. S. Beard 502 (N); P. Beard 1052 (S); Crudy s.n. (Mu—1452); Herb. Schreber s.n. (Mu—1051). St. Vincent: Morton 4760 (W—1883927); Smith & Smith 613 (Ed); L. V. Wall s.n. (V). TRINIDAD: J. H. Hart 1376 (B). WEST INDIES: Island undetermined: Herb. Adanson s.n. (P, P); Herb. Linnaeus G.784, S.1 (It—photo of logotype, Ls—logotype, N—photo of logotype, Z—photo of logotype); Ponthieu s.n. [1776] (S). SURINAM: G. F. W. Meyer s.n. [Herb. Zuccarini] (Mu—1053). CULTIVATED: Belgium: Moll s.n. (Br); Nyst s.n. (Br). LOCALITY OF COLLECTION UNDETERMINED: Herb. Baillon s.n. (P); Herb. Lamarck s.n. (P); Herb. Vaillant s.n. (P); L'Herminier s.n. (P); A. L. Richard s.n. (P). MOUNTED ILLUSTRATIONS: Lam., Tabl. Encycl. Méth. 3: pl. 541. 1797 (B, Cb).

CORNUTIA PYRAMIDATA var. ISTHMICA Moldenke

Literature: Millsp., Field Mus. Publ. Bot. 1: 316. 1896; Moldenke in Fedde, Repert. 40: 161, 187—188, 200, 201, & 203—205. 1936; Lundell, Carnegie Inst. Wash. Bull. 478: 75, 111, 113, 138, & 183. 1937; Moldenke, Geogr. Distrib. Avicenn. 14 & 15. 1939; Moldenke, Alph. List Common Names 18 & 24. 1939; Moldenke, Suppl. List Common Names 13 & 16. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 206—207. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 16, 20, 21, & 92. 1942; Moldenke, Phytologia 2: 102. 1944; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 29, 35, 36, & 184. 1949; Moldenke, Résumé 35, 41, 43, & 454. 1959.

Lundell (1937) cites Cook & Martin 128 as "Cornutia pyramidata L. (?)" and records the vernacular name "latche". He also states that var. isthmica is a large shrub found in marginal forests and the central zone of drained sinkholes or "zukches" in El Petén. The "Cornutia pyramidata" recorded by Millspaugh (1896) is actually C. latifolia (H.B.K.) Moldenke. The true C. pyramidata is

confined to the West Indies. Its var. isthmica and C. latifolia are very similar in appearance. Since they also have practically the same geographic distribution, it is questionable whether they are actually distinct from each other. The entire young inflorescences are often quite blue in both -- a condition, however, which is seen in all the northern species of the genus. Lundell 433 was originally distributed as C. pyramidata while his no. 3450 was identified as C. grandifolia (Schlecht. & Cham.) Schau. Additional common names recorded for var. isthmica are "pangage" and "x oltexmuc". A complete description of the variety is found in Carnegie Inst. Wash. Publ. 522: 206 (1940).

Additional citations: MEXICO: Campeche: C. L. Lundell 852 (Du--237579). Tabasco: J. N. Rovirosa 227 (Pa). GUATEMALA: El Petén: C. L. Lundell 3450 (Me, S). BRITISH HONDURAS: C. L. Lundell 433 (Cp, Du--193366, Us).

CORNUTIA THYRSOIDEA Banks & Moldenke

Synonymy: Cornutia thyrsoides Banks ex Moldenke, Alph. List Invalid Names Suppl. 1: 8, in syn. 1947. Cornutia thyrsoides Banks & Moldenke, in herb.

Literature: Moldenke in Fedde, Repert. 40: 160, 193--195, & 200--205. 1936; Moldenke, Geogr. Distrib. Avicenn. 6 & 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25, 73, & 92. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 61. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 8. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46, 160, & 184. 1949; Moldenke, Résumé 55, 218, 276, & 454. 1959.

The inflorescence is mostly not leafy, the corolla sometimes bluish-purple, and the ovary verruculose, 1--1.8 mm. long and wide.

This plant has been misidentified in herbaria as Citharexylon berterii Spreng., and has been collected in anthesis in April.

Additional citations: JAMAICA: W. Harris 5199 (Bg); Sangster 563 (N); Tussac s.n. [1807] (Dc); W. Wright s.n. [Jamaica] (Ed); Wullschlgel 1386 (Mu--1126).

ADDITIONAL NOTES ON THE GENUS PETITIA. I

Harold N. Moldenke

Considerable information has come to light and many additional specimens have come to hand since the publication of my monograph of this genus in 1937. Full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material was examined, in whole or in part, will be found in Phytologia 5: 154-

159 (1955), 6: 242 (1958), and 7: 91--92 (1959), 123--124 (1960), and 293 (1960).

PETITIA Jacq.

Additional synonymy: *Petiria* Jacq. ex Moldenke, Alph. List Cit. 1: 308, sphalm. 1946.

Literature: P. Browne, Civil & Nat. Hist. Jamaica., ed. 1, 265. 1756; Jacq., Enum. Syst. Pl. Carib. 1 & 12. 1760; Jacq., Hist. Stirp. Amer. 14, pl. 182, fig. 6. 1763; Sw., Prodr. 31 & 91. 1788; Gaertn., Fruct. & Sem. Pl. 1: 270, pl. 56, fig. 8. 1788; P. Browne, Civil & Nat. Hist. Jamaica., ed. 2, 265. 1789; Neck., Elem. 2: 407. 1790; Willd., Sp. Pl. 1: 614. 1797; Lam., Tabl. Encycl. Méth. 3: pl. 545, [fig. 2] g--o. 1797; Sw., Fl. Ind. Occ. 2: 1046. 1800; Mirbel, Nat. Hist. Pl., ed. 3, 15: 213. 1805; A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 68. 1806; Poir. in Lam., Encycl. Méth. Bot. Suppl. 1: 348 (1810) and 2: 367. 1811; Lunell, Hort. Jamaica. 1: 292. 1814; Poir. in Lam., Dict. Sci. Nat. 9: 286. 1817; H.B.K., Nov. Gen. & Sp. Pl. 2: 248. 1818; Steud., Nom. Bot., ed. 1, 202. 1821; Poir. in Lam., Tabl. Encycl. Méth. 3: 95. 1823; Schult. in Roem. & Schult., Syst. Veg. Mant. 3: 50. 1827; Reichenb., Conspect. Reg. Veg. 1: 117. 1828; Loud., Encycl. Pl. 523. 1829; J. Gay, Ann. Sci. Nat. Paris, sér. 1, 26: 219. 1832; Lindl., Bot. Reg. 29: Misc. 65--66. 1843; Walp., Repert. 4: 72 & 78. 1845; Schau. in A. DC., Prodr. 11: 524--525, 614, & 639. 1847; A. Rich. in Sagra, Hist. Fis. Cuba 2 (2): 145. 1850; C. Mueller in Walp., Ann. Bot. 5: 709. 1860; Griseb., Fl. Brit. West Ind. 501--502. 1861; Bocq., Adansonia [Rev. Verbenac.] 3: 97 & 193, pl. 9. 1863; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 219. 1863; Benth. in Benth. & Hook. f., Gen. Pl. 2: 1132--1136 & 1151--1152. 1876; Hemsl., Biol. Cent.-Am. Bot. 2: 539. 1882; W. Mill., Dict. Eng. Names Pl. 1884; Fawcett, Prov. List Indig. Nat. Fl. Pl. Jamaica. 30. 1893; Jacks., Ind. Kew. 1: 386 (1893) and 2: 477. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 144 & 167. 1895; Urb., Symb. Ant. 5: 485. 1908; O. E. Schulz in Urb., Symb. Ant. 6: 69. 1909; Gerth van Wijk, Dict. Plantnames 1: 970. 1911; Standl., Contrib. U. S. Nat. Herb. 23: 1252. 1924; Record & Mell, Timbers Trop. Am. 524--525. 1924; Britton & P. Wils., Scient. Surv. Porto Rico 6: 148. 1925; Urb., Arkiv Bot. 21A (5): 94. 1927; Seymour, Host Ind. Fungi N. Am. 588--589. 1929; Moldenke in Fedde, Repert. 37: 226. 1934; Junell, Symb. Bot. Upsal. 4: 88, 92--93, 200--201, & 213--214, fig. 134. 1934; Moldenke, Brittonia 1: 415 & 469. 1934; Moldenke in Fedde, Repert. 40: 48--49 & 82--83 (1936), 41: 135 (1936), and 42: 229--251. 1937; Moldenke, Geogr. Distrib. Avicenn. 1, 4--9, & 39. 1939; Moldenke, Alph. List Common Names 4--8, 12, 14, 24--26, 28, & 33. 1939; Moldenke, Prelim. Alph. List Invalid Names 10, 12, 15, 17, 33, & 38. 1940; Moldenke, Suppl. List Common Names 3, 5, & 7. 1940; Moldenke, Alph. List Invalid Names 8, 10, 13--15, 34, & 38. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24--28, 73, & 97. 1942; Moldenke, Phytologia 2: 107--108. 1944; Reko, Bol. Soc. Bot. Mex. 4: 35. 1946; Gregory & Vélez, Caribb. Forest. 7: 8, 10, 20, 22, & 33. 1946; Moldenke, Alph. List Cit. 1: 2, 6, 7, 11, 39, 40, 43,

55--57, 60--67, 74, 89, 99, 112, 114, 120, 123, 129, 130, 135, 138, 162, 179, 183--186, 188, 189, 195--197, 207, 208, 211, 216, 221, 258, 259, 270, 272, 273, 275, 277, 301--309, 311, 312, 314, 315, 317, & 323. 1946; H. N. & A. L. Moldenke, *Fl. Life* 2: 18, 20, 22--24, 32, & 76. 1948; Moldenke, *Alph. List Cit.* 2: 335, 338, 339, 345, 353, 359, 392, 395, 403, 408, 409, 415, 417, 420, 422, 427, 431, 432, 434--437, 459, 486, 487, 490, 503, 513, 529, 545, 548, 549, 554, 559, 569, 570, 577, 579, 583, 587, 593, 621, 646, 647, & 650--652 (1948), 3: 653, 654, 664, 666, 675, 700, 706, 716, 720, 722, 737, 739, 757, 759, 760, 773, 780, 809, 813, 814, 822--825, 833, 841, 842, 853, 856, 858, 866, 867, 869, 871, 877, 887, 895, 898, 906, 916, 925, 937, 938, 943, 958, & 971 (1949), and 4: 982, 983, 986, 1013, 1016, 1019, 1020, 1026, 1027, 1030, 1033--1035, 1037--1039, 1043--1045, 1047, 1054, 1059, 1062, 1063, 1065, 1066, 1082, 1083, 1117, 1127, 1136, 1137, 1143, 1145, 1146, 1207, 1216, & 1304. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 42, 44--51, 162, & 192. 1949; Roig, *Dicc. Bot.* 1: 101 & 477 and 2: 1076. 1953; Moldenke, *Phytologia* 5: 154--159. 1955; Herter, *Revist. Sudam. Bot.* 10: 259. 1956; Alain in León & Alain, *Fl. Cuba* 4: 279, 280, & 311--312, fig. 133. 1957; Moldenke, *Phytologia* 6: 242. 1958; Alain, *Revist. Soc. Cub. Bot.* 15: 53. 1958; *Biol. Abstr.* 30: 3240, 4173, & 4396. 1958; Moldenke, *Résumé* 50, 52, 54--58, 60, 220, 242, 246, 253, 254, 257, 258, 330, 339, 409, & 464. 1959.

Petitia is given as a valid genus in the Labiatae, section Verbeneae, by Reichenbach in the reference cited above (1828). Junell (1934) discusses the gynoeceum morphology. Reko (1946) still includes Petitia as a valid member of the Mexican flora. I have shown, however, on pages 233--234 of my monograph (1937) that the Mexican plant on which this record is based is actually Citharexylum oleinum (Benth.) Moldenke.

Several typographic errors need correction in my monograph: on pages 230, 233, and 248 the *Ind. Kew.* 2: 477 reference should be dated "1894", not "1895"; on page 238 the Griseb., *Fl. Brit. West Ind.* reference should be dated "1861", not "1851", while on page 242 it is erroneously given as "1871".

On page 233 it is stated that the genus is not known from cultivation: since this was written I have seen cultivated material from Cuba, Jamaica, and Puerto Rico.

PETITIA DIAMENTENSIS Moldenke

Alain has shown, by actually visiting the type locality of this plant and collecting fresh material of it there, that it is conspecific with P. urbanii Ekm. The name should, therefore, be reduced to synonymy under the latter species.

PETITIA DOMINGENSIS Jacq.

Additional synonymy: Citharexylon foliis rugosis ovatis oppositis, petiolis geniculatis, racemis terminalibus, calycibus quadrifidis P. Browne, *Civil & Nat. Hist. Jamaic.*, ed. 1, 265. 1756.

Citharexylon 2 Browne ex Sw., Prodr. 91, in syn. 1788. Citharexylum paniculatum Gaertn. ex Poir. in Lam., Encycl. Méth. Bot. Suppl. 1: 348, in syn. 1810. Citharexylum menalocardium Sw. ex Poir. in Lam., Dict. Sci. Nat. 9: 286, in syn. 1817. Aegiphila punctata Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 219. 1863. Citharexylum panniculatum Gaertn. f. ex Moldenke, Prelim. Alph. List Invalid Names 17, in syn. 1940. Petitia domingensis Walp. ex Moldenke, Prelim. Alph. List Invalid Names 33, in syn. 1940; Roig, Dicc. Bot. 1: 101 & 2: 1076. 1953. Petitia poeppigii Jacq. ex Moldenke, Prelim. Alph. List Invalid Names 33, in syn. 1940. Petiria domingensis Jacq. ex Moldenke, Alph. List Cit. 1: 308, sphalm. 1946. Petitia poeppigii Schau. ex Roig, Dicc. Bot. 2: 1076, in syn. 1953. Petitia dominguensis Jacq. ex Moldenke, Résumé 330, in syn. 1959.

Literature: P. Browne, Civil & Nat. Hist. Jamaic., ed. 1, 265. 1756; Jacq., Enum. Syst. Pl. Carib. 12. 1760; Sw., Prodr. 31 & 91. 1788; P. Browne, Civil & Nat. Hist. Jamaic., ed. 2, 265. 1789; Gaertn., Fruct. & Sem. Pl. 1: 270, pl. 56, fig. 8. 1788; Willd., Sp. Pl. 1: 614. 1797; Lam., Tabl. Encycl. Méth. Bot. pl. 545, [fig. 2], g--o. 1797; Mirbel, Nat. Hist. Pl., ed. 3, 15: 213. 1805; A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 68. 1806; Poir. in Lam., Encycl. Méth. Bot. Suppl. 1: 348 (1810) and 2: 367. 1811; Poir. in Lam., Dict. Sci. Nat. 9: 286. 1817; Steud., Nom. Bot., ed. 1, 202. 1821; Poir. in Lam., Tabl. Encycl. Méth. Bot. 3: 95. 1823; Schult. in Roem. & Schult., Syst. Veg. Mant. 3: 50. 1827; Walp., Repert. 4: 72 & 78. 1845; Schau. in A. DC., Prodr. 11: 614 & 639. 1847; A. Rich. in Sagra, Hist. Cuba 11 (2): 145. 1850; Griseb., Fl. Brit. West Ind. 501--502. 1861; Bocq., Adansonia 3 [Rev. Verbenac.]: 193. 1863; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 219. 1863; Fawcett, Prov. List Indig. Nat. Fl. Pl. Jamaica. 30. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 167. 1894; Urb., Symb. Ant. 5: 485. 1908; O. E. Schulz in Urb., Symb. Ant. 6: 69. 1909; Record & Mell, Timbers Trop. Am. 525. 1924; Britton & P. Wils., Scient. Surv. Porto Rico 6: 148. 1925; Seymour, Host Ind. Fungi N. Am. 588--589. 1929; Junell, Symb. Bot. Upsal. 4: 88 & 92--93, fig. 134. 1934; Moldenke, Brittonia 1: 469. 1934; Moldenke, in Fedde, Repert. 40: 48--49 & 82--83 (1936) and 42: 233, 236, & 238--251. 1937; Moldenke, Geogr. Distrib. Avicenn. 4--9 & 39. 1939; Moldenke, Alph. List Common Names 4--8, 12, 14, 24--26, 28, & 33. 1939; Moldenke, Suppl. List Common Names 3, 5, & 7. 1940; Moldenke, Prelim. Alph. List Invalid Names 10, 12, 15, 17, 33, & 38. 1940; Moldenke, Alph. List Invalid Names 8, 10, 13--15, 34, & 38. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24--28, 73, & 97. 1942; Moldenke, Phytologia 2: 108. 1944; Gregory & Vélez, Caribb. Forest. 7: 8, 10, 20, 22, & 33. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 42, 44--51, 162, & 192. 1949; Roig, Dicc. Bot. 1: 101 & 477 and 2: 1076. 1953; Alain in León & Alain, Fl. Cuba 4: 311. 1957; Biol. Abstr. 30: 3240 & 4173. 1958; Alain, Revist. Soc. Cub. Bot. 15: 53. 1958; Moldenke, Résumé 50, 52, 54, 55, 57, 58,

60, 220, 242, 246, 253, 254, 257, 258, 330, 339, & 464. 1959.

Illustrations: Jacq., Hist. Stirp. Amer. 14: pl. 182, fig. 6. 1763; Gaertn., Fruct. & Sem. Pl. 1: pl. 56, fig. 8. 1788; Lam., Tabl. Encycl. Méth. Bot. pl. 545, [fig. 2] g--o. 1797; Bocq., Adansonia 3 [Rev. Verbenac.]: pl. 9. 1863; Junell, Symb. Bot. Upsal. 4: 92, fig. 134. 1934.

Collectors describe this plant as a shrub 2--3 m. tall or small tree to 22 m. tall, with greenish corollas and red fruit. Johansen reports that the wood is very hard, much used in Puerto Rico where strength is required, excellent and handsome for interior work and flooring. The species has been collected in woods, on hillslopes, coastal hillsides, and along roadsides in hills. Roig states that it is common all over Cuba in rocky soil. Holdridge 2 shows a branch with trifoliolate leaves, taken from a tree 4 feet tall, planted in a luquillo plantation. Common names, in addition to the ones listed in my monograph, are "arabo blanco", "bastard stopper", "black-fiddlewood", "bois de fredoché", "bois pelé", "bois sans écorce", "capa amarillo", "capa-blanca", "capa savannah", "chêne calebassic", "fiddle-wood", "fidéle", and "spur tree". The name "arabo blanco" is also applied to Ternstroemia obovalis A. Rich. in the Theaceae, while "fiddle-wood" is also applied to Citharexylum B. Juss., C. caudatum L., C. fruticosum L., and C. spinosum L.

It is worth pointing out that Callicarpa reticulata A. Rich. is a synonym of C. cubensis Urb., while C. reticulata Sw. is apparently a valid species in that genus; Citharexylum paniculatum Poepp. is a synonym of C. poeppigii var. margaritaceum Poepp. & Moldenke, while C. paniculatum Poir. is Premna obtusifolia R. Br.; and Petitia tenuifolia Willd. ex Schult. is Aegiphila quinduen-sis (H.B.K.) Moldenke.

Our plant is illustrated as Citharexylum in Gaertn., Fruct. & Sem. Pl. 1: 270, pl. 56 (1788) and this same figure is copied in Lam., Illustr. pl. 545, [fig. 2] g--o (1797) -- Gaertner's description also applies to Petitia rather than to Citharexylum. The Ledin collection cited below was originally distributed as Guettarda sp. Hansford has described Meliola petitiae as a parasite on Petitia domingensis in the Dominican Republic.

Additional citations: BAHAMA ISLANDS: New Providence: Curtiss 136 [March 26] (Cm, Vt), 136 [May 18] (Cm, Vt); O. Degener 19060 (N), 19062 (N); Ledin 260 (N). CUBA: Camagney: Acuña 13786 (Es). Havana: Bolde 16 (Q); León 7332 (Ha). Las Villas: Alain 3964 (Z); Combs 169 (Io--33784, Ka--61168); R. A. Howard 6588 (N); León 9162 (Ha); León & Clément 6649 (Ha), 6688 (Ha); León & Loustalot 9542 (Ha); Luna 644 (Ha). Oriente: Ekman 1939 (N), 9316 (N); León 12045 (Ha), 12045b (Ha, N); Linden 1977 (N--photo, S--photo, Z--photo); C. Wright 428 [Herb. Sauvalle 1783] (Hv, Hv, Pa, Tl). Province undetermined: C. Wright 425 (Hv), 641/1 [Herb. Sauvalle 1783] (Hv, Hv). ISLA DE PINOS: Eritton, Wilson, & León 6090 (Ha);

O. E. Jennings 659 (Cm), 660 (Cm), 676 (Cm). JAMAICA: Graham s.n. (Z—photo); Howard & Proctor 14061 (N); Maxon & Killip 1497 (Ur); G. R. Proctor 10138 (N). HISPANIOLA: Dominican Republic: H. A. Allard 14241 (S); Chardon 463, host (It); Fuertes 195 (Lu); Howard & Howard 8848 (N); Scarff 25a (F—924738); Schiffino 122 (S). Haiti: Ekman H.30 (F—839481), H.707 (N—photo, Z—photo), H.2185 (Mi). PUERTO RICO: Heller & Heller 820 (Bz—22020, Lu), 1229 (Bz—22019); Johansen s.n. (Oa); Sintenis 857 (Lu, Sg—16041), 1073 (Pa), 3864 (Io—75756), 5511 (Lu). CULTIVATED: Cuba: Moldenke & Moldenke 19889 (Es, Lg, Mg, Mr, N, No, Ot, Sm). Jamaica: Herb. Univ. Illinois s.n. [1917] (Ur, Ur). Puerto Rico: Holdridge 2 (N). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 14 [Madraga] (Q); Sessé, Mocino, Castillo, & Maldonado 626 (F—847867), 640 (F—847781).

PETITIA DOMINGENSIS var. *EKMANI* Moldenke

Literature: Moldenke in Fedde, Repert. 42: 235 & 247—249. 1937; Moldenke, Geogr. Distrib. Avicenn. 7. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 26 & 97. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 57. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 48 & 192. 1949; Moldenke, Résumé 57 & 464. 1959.

Collectors describe this variety as a small tree, growing in a limestone quarry, blooming in September. The leaflet-blades are narrow-lanceolate.

Additional citations: HISPANIOLA: Dominican Republic: Ekman H.7009 (Ca—608092—*isotype*).

PETITIA URBANII Ekm.

Synonymy: *Petitita diamantensis* Moldenke in Fedde, Repert. 42: 236—237. 1937. *Petitita diamantensis* Moldenke, Geogr. Distrib. Avicenn. 5, sphalm. 1939.

Literature: Ekm. in Urb., Arkiv Bot. 21A (5): 94. 1927; Moldenke in Fedde, Repert. 42: 236—237, 248, & 250. 1937; Moldenke, Geogr. Distrib. Avicenn. 5. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25, 26, & 97. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 87. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44, 47, & 192. 1949; Alain in León & Alain, Fl. Cuba 4: 311—312, fig. 133. 1957; Moldenke, Résumé 52, 56, 330, & 464. 1959.

Illustrations: Alain in León & Alain, Fl. Cuba 4: fig. 133. 1957.

Collectors describe this species as a much-branched shrub, 2 m. tall, with the corollas light-yellow. It has been found on dry and steep limestone rocks and coastal thickets, flowering in May.

Additional citations: CUBA: Oriente: Acuña & Diaz Barreto 17438 (Es); Alain & López Figueiras 7070 (Bm); Alain & Morton 5196 (Ss, Ss); León 11893 (Ha, N); León & Victorin 17162 (Z). HISPANIOLA: Haiti: Ekman H.4096 (Ca—608091—*isotype*, F—839482—

isotype, Mi--isotype).

ADDITIONAL NOTES ON THE GENUS PETREA. V

Harold N. Moldenke

PETREA Houst.

Additional and emended synonymy: Petraea L. apud A. L. Juss., Gen. Pl., ed. 1, 108. 1789. Petrea L. ex Steud., Nom. Bot., ed. 1, 606. 1821. Petraea Houst. ex Meisn., Pl. Vasc. Gen. 291. 1839. Petraeae L. apud Augusto, Fl. Rio Grande do Sul 227, sphalm. 1946. Petrae Nees apud F. C. Hoehne, Relat. Anual Inst. Bot. São Paulo 1951: 100, sphalm. 1955.

Additional and corrected literature: L., Hort. Cliff. 319. 1737; L., Sp. Pl., ed. 1, 626. 1753; L., Gen. Pl., ed. 5, 275. 1754; Jacq., Select. Stirp. Amer. Hist. 180--181, pl. 114. 1763; Jacq., Select. Stirp. Amer. Hist. Picta pl. 173. 1780; Houst., Reliq. 5: pl. 11. 1781; A. L. Juss., Gen. Pl., ed. 1, 108 (1789) and ed. 2, 121. 1791; Gaertn., Fruct. & Sem. Pl. 2: 471, pl. 177, fig. 5. 1791; Jacq., Icon. Select. Stirp. Amer. pl. 114. 1797; Curtis, Bot. Mag. 17: pl. 628. 1803; Mirb., Hist. Nat. Pl. 15: pl. 104. 1805; Joh. Kerner, Hort. Semperv. pl. 151. 1805; J. E. Sm. in Rees, Cycl. 27, no. 2. 1814; H.B.K., Nov. Gen. & Sp. Pl. 2: 282--283. 1818; Nees, Flora 4 (1): 300 & 330. 1821; Steud., Nom. Bot., ed. 1, 606. 1821; Schrad., Götting. Gel. Anz. 1821 (2): 712. 1821; Wied-Neuwied, Reise Brasil. 1: 358 & 2: 342. 1821; Lodd., Bot. Cab. 8: pl. 736. 1823; Nees, Nov. Act. Physico-med. Acad. Caes. Leopold.-Car. Nat. Cur. 11: 72--73. 1823; Spreng. in L., Syst. Veg., ed. 16, 2: 761. 1825; Vell., Fl. Flum. 254 (1825) and Icon. 6: pl. 59. 1827; Cham., Linnaea 4: 292. 1829; Lodd., Bot. Cab. 17: pl. 1606. 1830; Cham., Linnaea 7: 367--370. 1832; Geél, Sert. Bot. 3: cl. 14. 1832; Richter, Linn. Op. 604. 1835; Endl., Gen. Pl. 1: 636. 1838; Neumann, Ann. Fl. Pom. 1837-1838: 254--255, pl. 32. 1838; Paxt., Mag. Bot. 4: 199--200. 1838; Benth., Ann. Nat. Hist., ser. 1, 2: 448. 1839; Meisn., Pl. Vasc. Gen. 291. 1839; Richter, Cod. Linn. 604. 1840; Knowles & Westc., Floral Cab. 3: 70, pl. 108. 1840; Steud., Nom. Bot., ed. 2, 2: 309. 1841; Steud., Flora 26: 764. 1843; Presl, Bot. Bemerk. 99. 1844; Mart. & Gal., Bull. Acad. Roy. Brux. 11 (2): 328--329. 1844; Walp., Repert. 4: 70. 1845; Benth., Pl. Hartw. 246. 1846; Schau. in A. DC., Prodr. 11: 616--620. 1847; Miq., Stirp. Surinam. [Nat. Verh. Holl. Maatsch. Wet. Haarlem, ser. 2, 7:] pl. 42. 1850; Schau. in Mart., Fl. Brasil. 9: 272--277 & 307, pl. 45 & 46. 1851; Benth., Pl. Hartw. 358. 1857; Griseb., Abhand. Königl. Gesell. Wissen. Götting. 7: 256. 1857; Héribin, Hort. Franç. 1858: pl. 6. 1858; Griseb., Fl. Brit. West Ind. 498. 1861; Kttingsh., Blatt-Skel. Dikot. 79, pl. 28,

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Estrada records the common name "petrea" for members of this genus in Cuba, and Daniel records "pluma de reina" for them in Antioquia, Colombia. The Vogl 1520 distributed to herbaria as a Petrea is actually Tetrapteris discolor (G. F. W. Mey.) DC. in the Malpigiaceae.

On pages 2 and 12 of my original monograph of Petrea (1934) I gave "1895" as the date of publication of Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 158, but the date apparently should be "1894". Similarly, on pages 2, 22, 28, 32, 33, 36, 161, 179, 180, 182, 204, and 206 I dated Jacks., Ind. Kew. 2: 477--478 as "1895" when it should have been "1894" instead.

For full explanation of the abbreviations employed herein for the names of the 255 herbaria whose material has been examined, in whole or in part, will be found in Phytologia 5: 154--159 (1955), 6: 242 (1958), and 7: 91--92 (1959), 123--124 (1960), and 293 (1960).

PETREA AMAZONICA Moldenke

Literature: Moldenke in Fedde, Repert. 43: 15, 173--174, 210, & 216. 1938; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 97. 1942; Moldenke, Phytologia 2: 173. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89 & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 103 & 464. 1959.

PETREA ANDREI Moldenke

Literature: Moldenke in Fedde, Repert. 43: 16, 188--190, 210, & 211. 1938; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Alph. List Common Names 8. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 97. 1942; Moldenke, Phytologia 2: 108. 1945; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Phytologia 2: 499. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 48. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70 & 192. 1949; R. Espinosa, Est. Bot. Sur Ecuad. 2: 67. 1949; Moldenke, Résumé 80 & 464. 1959.

Espinosa describes this plant as a well-developed liana, climbing up large trees, with its leaves oval in shape, about 15 cm. long and 6 cm. wide, the "brácteas" beautiful blue-violet, and the "flores" sea-blue, growing at 60--80 m. altitudes. A common name is "chivovo gueb."

QUERCUS DISCRETA LAUGHLIN

Hibrida nova

Quercus shumardii X *velutina*

Kendall Laughlin (1890-)
165 Pine Ave., Chicago, Ill.

A tree 61 cm. in diameter and 12 m. tall with stout limbs slightly ascending. Bark dark grayish brown, rather thin, with shallow concave vertical ridges about 2.5 cm. wide. Season's branchlets glabrous, brown with white lenticels, mottled with gray in later years. Terminal winter buds 6-8 mm. long, conic, slightly angled, acute, reddish brown, puberulous.

Leaf blades 7-14 cm. long, 5-11.5 cm. wide, glabrous, rather lustrous and olive green above, slightly paler beneath and glabrous except for small tufts of rusty tomentum in the axils of the pale yellow midrib, obovate in peripheral outline, deeply divided into 3 pairs of lateral lobes extending more than halfway to the midrib and separated by elliptic sinuses; the lower lobes acute, with or without a lateral tooth on the proximal side; the middle lobes of constant width with a 3-toothed apex and 2 lateral teeth; the upper lobes the widest, broadening, with a 3-toothed apex and a lower 2-toothed lobule and a primary vein making an angle of about 45° with the midrib; the terminal lobe up to 6.5 cm. wide, trilobate, divided into 2 often enlarged 2-4-toothed lateral lobes, the apex 3-5-toothed. Base truncate or nearly so.

Petioles 2-3.5 cm. long, subterete but narrowly flattened on their upper surface, glabrous, pale yellow green.

Acorns solitary or paired, 19-22 mm. long; cup hemispheric-cup-shaped, 11-12 mm. high, 18-21 mm. wide, covered with thin appressed lanceolate glabrous scales, light gray with a conspicuous brown border, extending below the rounded base of the cup for a distance of 4-5 mm. over the torus to its connection with the short peduncle; nut greenish brown or occasionally yellowish brown, oblong, 17-18 mm. long, 14-16 mm. wide, two-fifths enclosed in the cup, puberulous at the apex and under the cup and sparingly so elsewhere.

QUERCUS DISCRETA Laughlin

Arbor 61 cm. diametro et 12 m. alta cum leviter ascendentibus pinguibus membris. Cortex fuscus cinereo-brunneus, tenuior, vadosis concavis ad perpendicularum directis fastigiis circa 2.5 cm. latis. Novi temporis ramuli glabri, brunnei albis lenticellis, vetustioribus annis cinereo maculosi. Extremae hiemis gemmae 6-8 mm. longae, turbinatae, leviter angulatae, acutae, rufo-brunneae, puberulentes.

Folia 7-14 cm. longa, 5-11.5 cm. lata, supra glabra, lucidiora olivariaque, subtus leviter pallidiora et glabra praeter parvis cristis rubiginosi tomenti in axillis pallidae galbinae costae mediae, obovata circumcurrente adumbratione, alte divisa in 3 lobos lateralis utroque latere extendentis plus quam dimidio ad costam mediam et separatos ellipticis sinibus; lobi humiliores acuti cum aut sine laterali dente in proximali latere; lobi medii constantis latitudinis apice ter dentato et 2 lateralibus dentibus; lobi superiores latissimi dilatantes apice ter dentato et humiliore lobulo bis dentato et nervo principali faciente angulum circa 45° cum costa media; lobus extremus tenuis 6.5 cm. latus trilobatus divisus in 2 saepe ampliatis 2-4-dentatos lateralis lobos, apice 3-5-dentato. Basis truncata vel fere ita.

Petioli 2-3.5 cm. longi, prope rotundi sed in superficie anguste complanati, glabri, pallidi galbini.

Glandes solae aut compositae, 19-22 mm. longae; cupula hemisphaerica-poculoformis, 11-12 mm. alta, 18-21 mm. lata, tecta cum tenuibus adpressis lanceolatis glabris squamis pallidis cinereis notabili brunneo margine extendentibus sub rotunda base cupulae 4-5 mm. super toro ad juncturam cum pedunculo brevi; nux viridi-brunnea aut interdum fulva, oblonga, 17-18 mm. longa, 14-16 mm. lata, duobus-quintis conclusa in cupula, puberulens in apice et sub cupula et parce ita alibi.

QUERCUS DISCRETA Laughlin

This tree, 24 inches in diameter, 6 feet 4 inches in circumference and 41 feet tall, is located in the eastern part of Swope Park, Kansas City, Missouri, at the east edge of the upland of Golf Course No. 1 overlooking Wild Cat Hollow and at the west edge of a truck trail bordering the golf course, about four hundred feet west of the Kansas City Southern Railway at about 69th Street. It was struck by lightning long ago and ripped from top to bottom and its leader was killed. It has escaped destruction by woodchoppers because it is at the edge of the golf course. There are some Black Oaks about 125 feet to the west and

there used to be a Shumard Oak on a ridge beyond. In the original landscape there may have been other hybrids to the westward, destroyed in making the golf course. Thousands of Oaks in Swope Park have been wantonly destroyed by contractors, workers and political hirelings of the Kansas City Park Board, which recognizes no policy of preservation or conservation.

The leaves of discreta look like shumardii in their shape and truncate base. They differ in having smaller tufts of tomentum and shorter petioles.

The winter buds of discreta are like shumardii. The only evidence of velutina ancestry is their pubescence.

The acorns of discreta are different from any species. They are shaped like velutina, but the cup-scales are closely appressed. The nuts also resemble velutina but are never striate. The discrete, dark bordered scales are uniquely distinctive and the most remarkable character of this taxon.¹ These scales extend down over the torus. This character never appears in shumardii and is only slightly developed in velutina.

The combination of characters described above makes it hypothetically certain that discreta is a hybrid of shumardii and velutina. Ernest J. Palmer has examined specimen material and has concurred in this conclusion, modified, however, by his opinion that the Shumard parent is probably the variety schneckii.

The nearly smooth bark of this tree reminded me of W. W. Ashe's description of leiodermis from a nearby locality (Elisha Mitchell Sci.Soc. Jour. 40:43). But the acorns of discreta are much larger than the length of 12-16 mm. given in Ashe's description. No one has found a tree that fits Ashe's description; and there seems to be no specimen material of leiodermis in existence.

Hybrids have been previously described between shumardii and six species, and between velutina and ten species. Both shumardii and velutina are found in sixteen states. The question may be asked, why has no hybrid of shumardii and velutina been discovered up to this time unless perchance there is a sterility barrier between them? I have noticed many peculiarities among the Erythrobalani in the Midwest. Rubra and velutina grow together over a wide range, but a hybrid between them is exceedingly rare. Ellipsoidalis usually grows with rubra but never hybridizes with it; on the other hand, ellipsoidalis hybridizes freely with velutina. Many hybrids of shumardii and palustris have been found in five counties of Missouri, but none have been found in the other ten states where both are sympatric. Imbricaria hybridizes rather freely with

rubra and velutina, tho it is placed in a different series. Velutina and marilandica hybridize freely. The insufficiency of field information about hybrid Oaks is indicated by the fact that there are about a hundred trees of bushii, leana and bebbiana in Forest Park in St. Louis, but not a single specimen from that park in the herbarium of the Arnold Arboretum is listed in E. J. Palmer's "Hybrid Oaks of North America" (A.A.J. 29:1).

Specimen material will be deposited in the Royal Botanic Gardens, Kew, England, and in the U.S. National Herbarium, Washington, D.C., by way of the U.S. Forest Service.

¹For an example of a hybrid of shumardii bearing cup-scales different from both parent species, see the silvery gray cup-scales of a form of mutabilis illustrated in the middle of page 378 of Volume 6 of PHYTOLOGIA.

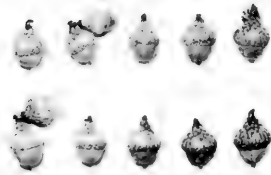


QUERCUS DISCRETA

BARK OF
QUERCUS DISCRETABARK OF QUERCUS
SHUMARDII SCHNECKII
A tree near the
east bank of the
Blue River in
Swope Park



QUERCUS DISCRETA
23% of natural size



25% of natural size



69% of natural size

ACORNS OF QUERCUS DISCRETA

PHYTOLOGIA

Designed to expedite botanical publication

Vol. 7

April, 1961

No. 8

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THE APPLICATION OF *ZAMIA PUMILA* L.

Lyman B. Smith

In his monograph of the Cycadaceae in the Pflanzenreich (p. 143, 154), J. Schuster reduces *Zamia pumila* L. to the synonymy of the later *Z. furfuracea* L. f. and *Z. media* Jacq. because he considers it a nomen confusum. However, it is confused only insofar as it includes more than one species, a common situation with Linnaean names. There is no confusion about the identity of the two species involved, and under the International Code of Nomenclature it only remains to determine which of the two was first validated or which first reduced to synonymy.

Linnaeus in his original publication of *Z. pumila* (Sp. Pl. ed. 2. 1659. 1763) cites four references: Miller, Commelin, Plukenet, and Trew. Of these only Commelin belongs to the West Indian species described by Schuster under *Z. media* and the remainder belong with the Mexican *Z. furfuracea*.

Schuster accounts for three of the four Linnaean citations, but unaccountably omits any mention of Miller there or later, and it is Miller that settles the question. In the 1768 edition of his Gardener's Dictionary, which is the first to be valid for species descriptions, Miller publishes *Palma pumila* and cites the same Plukenet and Trew references as Linnaeus but omits the Commelin reference. This action automatically emends the Linnaean species to include the Mexican references and exclude the West Indian.

To make the case complete Aiton published *Z. debilis* in his Hortus Kewensis and based it on the Commelin citation while omitting the other Linnaean references. The summary of the nomenclature is as follows:

ZAMIA PUMILA L. Sp. Pl. ed. 2. 1659. 1763.

Palma pumila Mill. Gard. Dict. ed. 8. 1768.

Zamia furfuracea L. f. in Ait. Hort. Kew. 3:477. 1789; J.

Schuster in Engl. Pflanzenreich IV. Fam. 1:143. 1932.

ZAMIA DEBILIS Ait. Hort. Kew. 3:478. 1789.

Zamia media Jacq. Pl. Hort. Schönbr. 3:77, pl. 397-398. 1798;

J. Schuster in Engl. Pflanzenreich IV. Fam. 1:154. 1932.

NOTES ON BROMELIACEAE, XVI

Lyman B. Smith

MEXICO

PITCAIRNIA MODESTA L. B. Smith, sp. nov.

A *P. tuerckheimii* Donn. Smith, *P. hintoniana* L. B. Smith atque *P. leprosa* L. B. Smith quibus affinis, bracteis florigeris magnis, floribus reflexis, sepalis acuminatis densissime ferrugineo-lanatis differt.

Stemless, flowering 9 dm. high; leaves many in a dense pseudo-bulb; sheaths suborbicular, dark brown, sublustrous, glabrous; blades dimorphic, some reduced to dark brown flat retrorsely serrate spines, others green, deciduous along a straight transverse line, serrate below the line, unknown above but presumably like the larger scape-bracts; scape erect, ca. 1 cm. in diameter at base, densely brown-floccose; scape-bracts imbricate, ovate becoming glabrous, the lowest few with small spinose serrate blades 12 mm. wide, the highest with long almost filiform blades; inflorescence simple, subdense, 3 dm. long; rhachis slender, flexuous, densely ferruginous-lanate; floral bracts ovate, acuminate, to 6 cm. long, soon glabrous; pedicels arching, ca. 15 mm. long, lanate; flowers secund, reflexed; sepals ovate, acuminate, 35 mm. long, densely ferruginous-lanate, the posterior subcarinate; petals at least 10 cm. long, naked; ovary more than 4/5 superior; ovules caudate. Pl. I, fig. 1: Floral bract and flower x 1/2; fig. 2: Sepal (ventral side) x 1.

Type in the herbarium of the University of Texas, No. 100,067, collected in granitic soil on mountainside beside a swift stream, among mixed pine and cacti, 25 miles south of Chilpancingo, State of Guerrero, Mexico, August 16, 1947, by John B. Paxson, Grady L. Webster and Fred A. Barkley (No. 17-M-819).

VENEZUELA

COTTENDORFIA GRACILLIMA L. B. Smith, sp. nov.

A C. serrulata (L. B. Smith) L. B. Smith, cui affinis, inflorescentiae axibus gracillimis, pedicellis elongatis bracteis florigeras superantibus differt.

Known only in young flower; rhizome very stout, over 3 dm. long; leaves very many, rosulate, forming a bulb ca. 8 cm. in diameter; sheaths orbicular, 5 cm. in diameter, dark castaneous; blades linear, acuminate, pungent, 30 cm. long, 24 mm. wide, about equaling the undeveloped inflorescence, subdensely serrulate throughout, glabrous, coriaceous, rich green, very narrowly yellow-margined; scape erect, slender; scape-bracts erect, densely imbricate, very narrowly triangular, serrulate throughout; inflorescence very laxly bipinnate with very slender axes, subdensely vestite with pale narrow spreading scales; primary bracts like the scape-bracts, much shorter than the branches; branches ascending, to 10 cm. long, not flexuous; floral bracts linear, 2.5 mm. long; pedicels spreading, very slender, 3.5 mm. long; sepals orbicular, 2.5 mm. long. Pl. I, fig. 3: Apex of leaf (ventral side) x 1; fig. 4: Base of branch x 1; fig. 5: Sepal x 2.

Type in the U. S. National Herbarium, No. 2,338,336, collected on moist cliff face, on northeast facing line of sandstone bluffs, northwest slopes of Cerro Venamo, State of Bolívar, Venezuela, altitude 1100 meters, April 21, 1960, by J. A. Steyermark and S. Nilsson (No. 436).

COTTENDORFIA GUIANENSIS (Beer) Kl. ex Baker var. VESTITA L. B. Smith, var. nov.

A var. guianensis laminis foliorum subtus dense cinereo-lepidotis solum vetustis plus minusve glabrescentibus differt.

Type in the U. S. National Herbarium, No. 2,338,340, collected in swampy savanna in valley of savanna of Río Uarama below Uarama-tepui at km. 150, vicinity of camp 150, northeast of Luepa, State of Bolívar, Venezuela, alt. 1220 m., April 25, 1960, by J. A. Steyermark and S. Nilsson (No. 567).

Paratypes: VENEZUELA: Bolívar: Vicinity of camp 150 at km. 150, in valley of savanna of Río Uarama below Uarama-tepui, northeast of Luepa, alt. 1220 m., April 24, 25, 1960, Steyermark & Nilsson 534 (VEN, US); 625 (VEN).

GUZMANIA STEYERMARKII L. B. Smith, sp. nov.

A G. plumieri (Griseb.) Mez, cui valde affinis, foliis et bracteis primariis inferioribus acuminatis subulato-involutisque, bracteis florigeris orbicularibus obtuse apiculatis, pedicellis brevioribus, sepalis altiore connatis differt.

Flowering 1.4 meters high; leaves rosulate, 6-9 dm. long, pale green, coriaceous, very obscurely punctulate-lepidote on both sides; sheaths inconspicuous, elongate; blades ligulate, acuminate, involute-subulate, pungent, 40-45 mm. wide; scape erect, about equaling the leaves, sparsely pale-flocculose; scape-bracts erect, imbricate and covering most of the scape, the lower foliaceous, the upper narrowly triangular from an ovate base; inflorescence laxly bipinnate, ample, subdensely white-flocculose; primary bracts shorter than the normal branches but equaling or exceeding abortive basal ones, the lower primary bracts like the upper scape-bracts, the upper ones broadly ovate and scarcely larger than the floral bracts; branches spreading, to 12 cm. long, slender, slightly flexuous or curved, laxly and more or less secondly many-flowered, red, the sterile base very short; floral bracts orbicular with a blunt triangular apiculus, 15 mm. long, subchartaceous when dry, nerved, red; pedicels obconic, 4 mm. long; sepals linear-lanceolate, obtuse, 22 mm. long, connate for 6 mm., coriaceous, glabrous; petal-blades broadly elliptic, 5 mm. long, yellow; stamens included, filaments adnate to the corolla-tube. Pl. I, fig. 6: Branch x 1/2; fig. 7: Sepals x 1.

Type in the U. S. National Herbarium, Nos. 2,338,333 to 2,338,335, collected on ground in mossy forest, northwest slopes of Cerro Venamo, State of Bolívar, Venezuela, altitude 1100 m., April 21, 1960, by J. A. Steyermark and S. Nilsson (No. 428).

Paratype: VENEZUELA: Bolívar: On ground, wooded quebrada, headwaters of Río Venamo, west of km. 125, northern slopes of Cerro La Danta, northwest of Cerro Venamo, alt. 1060 m., April 13, 1960, Steyermark & Nilsson 71 (US, VEN).

COLOMBIA

PUYA ALPICOLA L. B. Smith, sp. nov.

A P. gargantae L. B. Smith, cui affinis, inflorescentia ellip-

soidea multo robustiore, bracteis florigeris majoribus, sepalis coriaceis differt.

Flowering over 8 dm. high; leaves to 3 dm. long; sheaths sub-orbicular, 6 cm. wide, white and entire except for the castaneous serrulate apex; blades narrowly triangular, acuminate, 25 mm. wide, densely appressed-cinereous-lepidote on both sides, finally becoming glabrous above, laxly serrate with flat brown straight or slightly curved spines 3 mm. long; scape about 15 mm. in diameter, cinereous-lanate; scape-bracts very densely imbricate, the lowest subfoliaceous, the highest lance-ovate, acuminate, obscurely serrulate, subcoriaceous with thin crisped margins when dry; fruiting inflorescence simple, 25 cm. long, showing vestiges of a dense cinereous tomentum except on the petals; floral bracts like the upper scape-bracts, 8 cm. long, much exceeding the flowers; pedicels obconic, 10 mm. long; sepals lance-oblong, acute, 28 mm. long, coriaceous. Pl. I, fig. 8: Floral bract x 1/2; fig. 9: Old flower x 1/2; fig. 10: Sepal x 1.

Type in the U. S. National Herbarium, Nos. 2,340,736, and 2,340,737, collected on open rocky paramo, Laguna de Calocribe (east of Meollaca), Hoya del Río Donachuí, southeastern slopes of Sierra Nevada de Santa Marta, Department of Magdalena, Colombia, 3600-3700 meters altitude, September 30, 1959, by J. Cuatrecasas (No. 24547).

PUYA GRUBBII L. B. Smith, sp. nov.

A P. reflexiflora Mez, cui affinis, laminis foliorum angustioribus subtus obscure lepidotis, sepalis minoribus oblongis differt.

Flowering 1 meter high (! Grubb); leaves 3 dm. long; sheaths inconspicuous, sparsely appressed-lepidote; blades narrowly triangular, acuminate, glabrous above, minutely and obscurely lepidote between the nerves beneath, laxly serrate with slender straight suberect spines 3.5 mm. long; scape ca. 1 cm. in diameter, glabrous; scape-bracts densely imbricate, the lowest foliaceous, the others membranaceous and rapidly deciduous; inflorescence simple, over 3 dm. long, sublax with the rhachis visible throughout, many-flowered, pale-stellate-lepidote except the petals; floral bracts suborbicular, apiculate, distinctly exceeding the pedicels, entire, thin, drying almost black; flowers spreading to reflexed; pedicels slender, curved, to 13 mm. long; sepals oblong, obtuse, 20 mm. long, carinate at base; petals 35 mm. long, greyish green (! Grubb), bearing slight irregular folds at base. Pl. I, fig. 11: Floral bract and flower x 1; fig. 12: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,322,617, collected on broken cliffs by river, below Báchira, Sierra Nevada de Cocuy, Department of Boyacá, Colombia, altitude ca. 2050 meters, August 25, 1957, by P. J. Grubb, B. A. B. Curry, and A. Fernández-Pérez (No. 711).

PUYA ROSEANA L. B. Smith, sp. nov.

A P. glaucovirens Mez, cui affinis, ramis brevioribus densioribus, indumento ferrugineo differt.

Known from a single branch; inflorescence bipinnate, densely ferruginous-tomentose; primary bract imperfect but evidently shorter than the flat 4 cm. long sterile base of the branch; branch spreading, its axis 11 cm. long, visible at base but densely flowered above; floral bracts broadly ovate, apiculate, equaling or shorter than the pedicels; pedicels stout, 10 mm. long; flowers subspreading; sepals oblong, broadly acute or obtuse, 20 mm. long, the posterior ones more or less carinate toward base. Pl. I, fig. 13: Floral bract and old flower x 1.

Type in the U. S. National Herbarium, No. 2,340,469, collected in Ecuador by J. N. Rose (No. 23210-a). The type was mounted on the same sheet as flowering material of Puya thomasiana André and the field notes for No. 23210 give petal color, so the data on the label does not necessarily apply to P. roseana. Rose's specimens of Puya have been mixed considerably before mounting, so all that is reasonably certain is that P. roseana is from Ecuador.

PERU

PUYA MEMBRANACEA L. B. Smith, sp. nov.

A P. compacta L. B. Smith, cui affinis, bracteis primariis orbicularibus apiculatisque, sepalis lanceolatis differt.

Flowering about 1 meter high (! West); leaves 35 cm. long; blades very narrowly triangular, acuminate, rigid, glabrous above, densely and minutely appressed-lepidote beneath, laxly serrate with flat brown mostly retrorse spines 4 mm. long; scape about 1 cm. in diameter at apex, lanate; scape-bracts densely imbricate, the upper with a broad dark brown membranaceous base and linear subfoliaceous blade; inflorescence densely cylindric, bipinnate, densely pale-brown-lanate except the petals; primary bracts orbicular, apiculate, at least 4 cm. long, entire, pale brown, membranaceous, translucent, becoming more or less glabrous; lateral branches reduced to few-flowered pulvini; floral bracts elliptic, abruptly acuminate, slightly exceeding the sepals, membranaceous; pedicels cylindric, 6 mm. long; sepals lanceolate, acute, 20 mm. long, ecarinate; petals 35 mm. long, yellowish green (! West), naked. Pl. I, fig. 14: Primary bract and branch x 1/2; fig. 15: Sepal (ventral side) x 1.

Type in the University of California, No. 564,917, collected among rocks, Acanacu Pass, Province of Paucar tambo, Department of Cuzco, Peru, altitude 3600 meters, July 19, 1936, by James West (No. 7032).

PUYA WESTII L. B. Smith, sp. nov.

A P. glaucovirens Mez, cui affinis, bracteis florigeris pedicellos subaequantibus differt.

Flowering 2 meters high (! West); leaves over 1 meter long; blades linear, caudate-acuminate, to 25 mm. wide, covered with

pale appressed scales on both sides but becoming more or less glabrous above, laxly serrate with flat uncinat dark castaneous spines 6-8 mm. long; scape unknown; inflorescence very laxly bipinnate, densely and finely pale-ferruginous-tomentose; axis 17 mm. in diameter near base, red, glabrous with age; primary bracts narrowly triangular, acuminate, 4 cm. long, about equaling the sterile bases of the branches, spinose-serrulate; branches 35-63 cm. long, very laxly many-flowered; floral bracts broadly ovate, about equaling the pedicels; pedicels stout, 10 mm. long; flowers divergent to spreading; sepals oblong, broadly acute or obtuse, 20 mm. long, ecarinate; petals over 4 cm. long, bearing obscure folds at base, rose when dry; stamens equaling the petals but exerted at anthesis by the torsion of the petals; seeds broadly alate. Pl. I, fig. 16: Floral bract and flower x 1/2; fig. 17: Sepal x 1.

Type in the herbarium of the University of California, No. 584,237, collected on rocky slopes, near Huamachuco, Department of Libertad, Peru, altitude 3400 meters, November 26, 1936, by James West (No. 8353).

Paratype: Material apparently cultivated from the type, Huntington Gardens, Pasadena, California, H. E. Moore, Jr. 6454 (US)

TILLANDSIA SOMNIANS L. B. Smith, sp. nov.

T. denudata André in systema Mezii proxima sed foliis vix rigidis, inflorescentia bipinnata, bracteis florigeris acute carinatis, sepalis posticis breviter connatis differt.

Flowering 2 meters high (! West); leaves rosulate, at least 24 cm. long, rather soft, obscurely lepidote; sheaths broadly ovate, 3-4 cm. long, concolorous with the blades; blades ligulate, acuminate and when dry contorted at apex, 2 cm. wide; scape slender, elongate; lower scape-bracts foliaceous, densely imbricate, the upper elliptic, 5-6 cm. long, about equaling the internodes; inflorescence laxly bipinnate, over 2 dm. long, glabrous; rhachis geniculate; primary bracts like the upper scape-bracts, incomplete but probably shorter than the branches; spikes sharply reflexed, linear-lanceolate, acute, over 8 cm. long including the short bracteate sterile base, 15 mm. broad, strongly complanate, densely 12-flowered; floral bracts densely imbricate, lance-oblong, acute, 20 mm. long, equaling or exceeding the sepals, sharply carinate and nearly straight toward apex, coriaceous, even or nearly so; flowers subsessile; sepals lance-oblong, 17 mm. long, posteriorly short-connate. Pl. II, fig. 1: Primary bract and branch x 1/2; fig. 2: Posterior sepals x 1.

Type in the University of California, No. 561,827, collected in moist locations in narrow gulches between cliffs, at head of Quebrada of Atacongo near Lurin, Department of Lima, Peru, altitude 600 meters, October 13, 1935, by James West (No. 3608).

BOLIVIA

PUYA ALATA L. B. Smith, sp. nov.

A *P. smithii* Castellanos, cui affinis, spicis laxissimis,

bracteis primariis minimis integrisque, pedicellis dissite albido-lepidotis, sepalis majoribus differt.

Known only from fragments; leaves over 7 dm. long; blades narrowly triangular, acuminate, pungent, 3 cm. wide, glabrous above, densely vestite beneath and on the margins with pale subappressed scales, laxly serrate with flat antrorse spines 10 mm. long; scape unknown; inflorescence compound; primary bracts elliptic, apiculate, 2 cm. long, shorter than the sterile base of the branch, entire, sparsely and minutely lepidote with fine linear white trichomes; branches slightly flexuous, 3 dm. long, 3 mm. in diameter, very laxly flowered, angled, soon glabrous; floral bracts erect, like the primary bracts, much exceeding the pedicels; pedicels slender, to 10 mm. long, sparsely pale-lepidote; flowers downwardly secund; sepals lanceolate, rounded and apiculate, 26 mm. long, even, soon glabrous, alate-carinate; petals red-purple when dry. Pl. II, fig. 3: Base of branch x 1/2; fig. 4: Sepal x 1.

Type in the Chicago Natural History Museum, No. 754,160, collected on very dry rocky soil, Lagunillas, Valley of Tareira, Department of Potosí, Bolivia, altitude 1000 meters, August 1934, by M. Cárdenas (No. 2851).

PUYA MINIMA L. B. Smith, sp. nov.

A *P. tuberosa* Mez, cui affinis, foliis scapoque multo minoribus, foliorum lepidibus latis subpatentibus differt.

Flowering only 10 cm. high; leaves forming a subbulbous rosette, to 12 cm. long; sheaths broadly ovate, 15 mm. long, serrulate and appressed-lepidote toward apex, elsewhere entire and glabrous, the outer ones dark brown; blades linear-triangular, acuminate, to 6 mm. wide, covered on both sides with suborbicular slightly spreading cinereous scales, becoming glabrous above, laxly serrate with slender yellow-brown retrorse spines 1.5 mm. long; scape slender, pale-stellate-lepidote, mostly hidden by the leaves; scape-bracts imbricate, the upper ovate, acute, thin; inflorescence simple, 4 cm. long, subdense, few-flowered, sparsely pale-stellate-lepidote except the petals; floral bracts like the upper scape-bracts, to 13 mm. long, much exceeding the pedicels, bright red (! West); pedicels slender, to 8 mm. long; sepals oblong, broadly acute and apiculate, 11 mm. long; petals ca. 15 mm. long, naked. Pl. II, fig. 5: Floral bract and flower x 1; fig. 6: Sepal x 1.

Type in the University of California, No. 578,745, collected on bare gravelly ground of rocky grass- and brush-grown slopes, within the more or less permanent cloudbelt from about 2500 m. to top of Sama grade (east side), Cuesta de Sama, 30-35 km. northwest of Tarija, Province of Tarija, Bolivia, February 12, 1937, by James West (No. 8345).

PUYA POTOSINA L. B. Smith, sp. nov.

A *P. hofstenii* Mez, cui affinis, pedicellis multo majoribus bracteis florigeras subduplo superantibus differt.

Known only from fragments; leaves over 5 dm. long; blades very

narrowly triangular, caudate-acuminate, 25 mm. wide, densely pale-appressed-lepidote on both sides but becoming more or less glabrous above, laxly serrate with brown uncinat antrorse spines 3 mm. long; scape 8 mm. in diameter at apex, glabrous; scape-bracts small and exposing most of the upper scape, the ovate serrulate base 2 cm. long, the slender linear blade over 5 cm. long; inflorescence laxly bipinnate, 7 dm. long (! Cárdenas), glabrous, somewhat glaucous; primary bracts like the upper scape-bracts but with much shorter blades or merely apiculate, about equaling the sterile base of the branch; branches suberect, nearly straight, to 25 cm. long, 4 mm. wide at the flattened base, lax; floral bracts ovate, apiculate, to 15 mm. long, entire, thin; pedicels slender, enlarged upward, to 30 mm. long; flowers more or less secund, often subverticillate; sepals lanceolate, rounded and apiculate, 21 mm. long, carinate at base, sulcate when dry; petals 4 cm. long, naked; stamens included. Pl. II, fig. 7: Floral bract and flower x 1/2; fig. 8: Sepal x 1.

Type in the U. S. National Herbarium, No. 1,909,502, collected on dry slate slopes, Quechisla, Department of Potosí, Bolivia, altitude 3400 meters, December 1946, by M. Cárdenas (No. 3738).

PUYA RIPARIA L. B. Smith, sp. nov.

Ab omnibus speciebus adhuc cognitis, inflorescentia ex sicco nigra dense albido-lanata, spicis laxis, bracteis florigeris sepalisque magnis differt.

Flowering about 1.5 meters high; leaves over 5 dm. long; sheaths suborbicular, 6 cm. wide, glabrous, dark castaneous, lustrous, serrulate at apex; blades narrowly triangular, about 2 cm. wide, glabrous above, covered beneath with a layer of cinereous scales, laxly serrate with slender pale uncinat mostly antrorse spines 4-5 mm. long; scape 2 cm. in diameter near base, soon glabrous except the nodes; scape-bracts deciduous, unknown; inflorescence laxly bipinnate, narrowly pyramidal, 7 dm. long, drying black, densely white-lanate; primary bracts ovate, acute, ample, much exceeding the short flat sterile bases of the branches, thin coriaceous, becoming glabrous, the margins crisped when dry; lateral branches few, basal, 10-15 cm. long, lax, their floral bracts shorter than the sepals; terminal branch elongate with floral bracts the size of the primary bracts and much exceeding the sepals; pedicels rather stout, to 20 mm. long; flowers more or less secund; sepals lance-elliptic, apiculate, 42 mm. long, dull and rather rugose on drying; petals over 6 cm. long. Pl. II, fig. 9: Floral bract and flower x 1/2; fig. 10: Sepal (ventral side) x 1.

Type in the U. S. National Herbarium, Nos. 1,985,838 to 1,985,840, collected on rock walls by brook (photograph), on the road to Hacienda Chaco, eastern Cordillera, Bolivia, altitude 1350 meters, November 20, 1948, by Mulford B. Foster (No. 2578).

PUYA SECUNDA L. B. Smith, sp. nov.

A *P. stenothyrsa* (Baker) Mez, cui affinis, bracteis primariis quam ramorum basibus sterilibus brevioribus, floribus secundis,

bracteis florigeris brevibus differt.

Flowering 1-2 meters high (! Cárdenas); leaves over 7 dm. long; blades narrowly triangular, caudate-acuminate, 35 mm. wide, glabrous above, covered beneath with coarse subappressed whitish scales, laxly serrate with flat uncinat antrorse spines 10 mm. long; scape 2 cm. in diameter, densely and finely pale-flocculose; scape-bracts densely imbricate, the lower foliaceous, the upper acuminate from a broadly ovate base, serrulate, red; inflorescence laxly bipinnate, at first finely white-flocculose; primary bracts like the upper scape-bracts, much shorter than the long sterile bases of the branches; branches divergent, 15-30 cm. long, subdensely secund-flowered with the slender rhachis covered toward apex; floral bracts ovate, acuminate, 20-25 mm. long, about equaling the middle of the sepals, rather thin, red, obscurely serrulate, soon glabrous; pedicels slender, 5-10 mm. long; sepals linear-lanceolate, very narrowly obtuse and apiculate, 28 mm. long, ecarinate, soon glabrous; petals dark violet (! Cárdenas). Pl. II, fig. 11: Floral bract and flower x 1/2; fig. 12: Sepal (ventral side) x 1.

Type in the U. S. National Herbarium, No. 1,986,192, and 1,986,193, collected between Aguirre and Incachaca, Chapare, Department of Cochabamba, Bolivia, altitude 2000 meters, November 1948, by M. Cárdenas (No. 4381).

Paratype: BOLIVIA: Cochabamba: Semi-cloud forest above Yungas, eastern slope of Andes, alt. 3000 m., November 13, 1948, M. B. Foster 2550 (US).

BOLIVIA and ARGENTINA

PUYA HOFSTENII Mez, Fedde Rep. Spec. Nov. 3:8. 1906.

Puya hauthalii Mez, Fedde Rep. Spec. Nov. 16:65. 1919.

BOLIVIA: Potosí: Tala Chorolque near Guadalupe, Hauthal 101 (B, type of Puya hauthalii Mez, F photo 11402).

ARGENTINA: Jujuy: Dry slopes near Yavi, alt. 3400 m., Hofsten 1710 (B, type, F photo 11405).

Supposedly, appendaged petals and acuminate sepals distinguished Puya hauthalii from P. hofstenii, but petal-appendages by themselves have proved an unreliable character outside of Chile and Macbride's photograph of P. hauthalii plainly shows apiculate sepals.

CULTIVATION

PUYA HORTENSIS L. B. Smith, sp. nov.

A P. meziana Wittm., cui affinis, spicis laxioribus, bracteis florigeris aequalibus, infimis haud amplis et sepala occultantibus differt.

Known only from fragments but undoubtedly flowering 1-2 meters high; leaves 6-7 dm. long; sheaths reniform, 12 cm. wide, dark castaneous, glabrous except at apex; blades narrowly triangular, acuminate, pungent, to 70 mm. wide, pale-appressed-lepidote on both sides, becoming more or less glabrous, laxly serrate with

slender brown uncinatate spines 7 mm. long; scape unknown; inflorescence laxly bipinnate, finely pale-tomentose-lepidote, primary bracts elliptic, caudate-apiculate, 11 cm. long, much exceeding the sterile naked base of the branches, serrulate; branches divergent, straight, to 34 cm. long, rather laxly flowered with the rhachis wholly visible at anthesis; floral bracts uniform, lanceolate, apiculate, to 35 mm. long, reaching about the middle of the sepals, thin; pedicels slender, to 30 mm. long, persistently lepidote and contrasting with the glabrescent sepals; sepals lanceolate, rounded and apiculate, 27 mm. long, ecarinate, sulcate when dry; petals over 7 cm. long, naked, red-purple when dry; stamens included. Pl. II, fig. 13: Floral bract and flower x 1/2; fig. 14: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,053,883, collected from cultivated material of unknown origin at the Huntington Gardens, Pasadena, California, June 7, 1952, by H. E. Moore, Jr. (No. 6448). US 2,095,140, paratype from the Huntington Gardens collection (No. 36-39). US 2,252,224, paratype labeled with data and number (West 6479) belonging to Puya longistyla Mez, and from now on cited as West 6479-a. The origin of the plant thus remains a mystery, although it is possible that it was collected in Peru or Bolivia by the Goodspeed Expedition. West 6479-a is the best material but because of the label confusion it seems well not to choose it as the type.

NOTE

The eleven new species of Puya described above are the result of a preliminary revision of the genus in preparation of a monograph of the Bromeliaceae. It is not worthwhile to publish the key in its present rough form, but it is available for consultation. The recognizable species of Puya now number 138.

Plate I

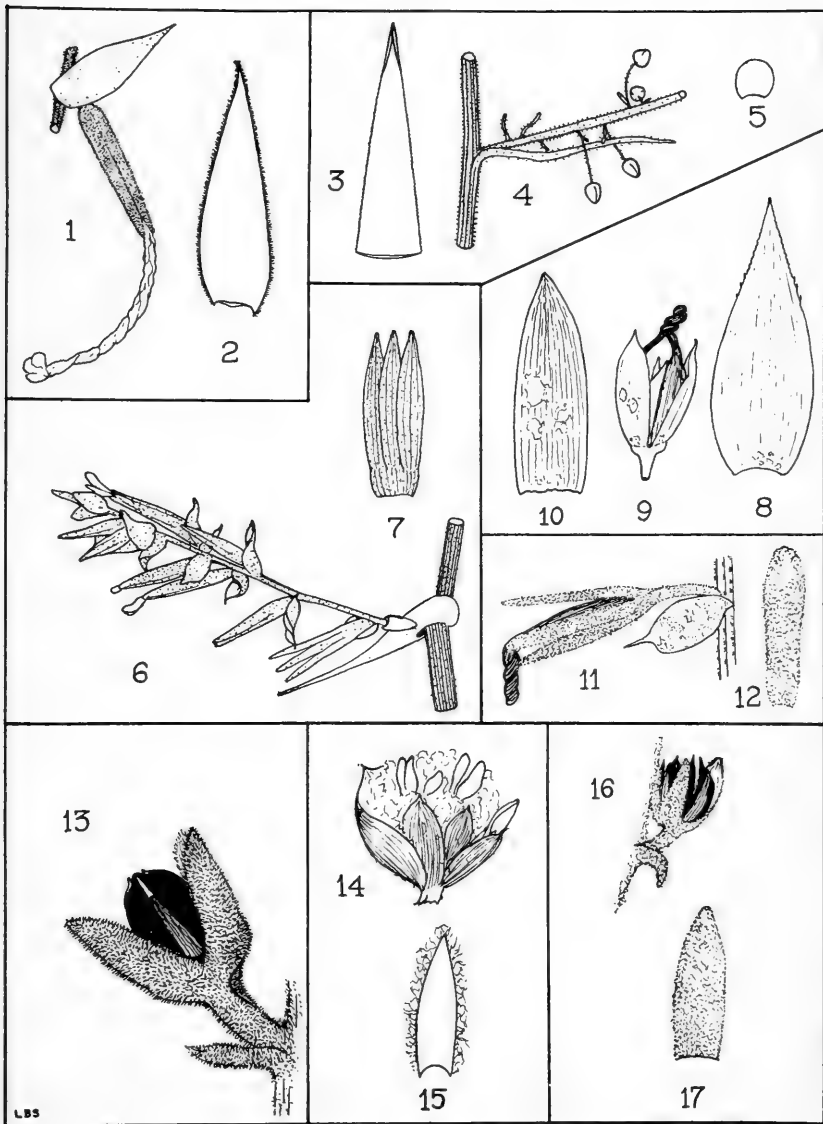


Fig. 1, 2: *Pitcairnia modesta*; fig. 3-5: *Cottendorfia gracillima*;
 fig. 6, 7: *Guzmania steyermarkii*; fig. 8-10: *Puya alpicola*;
 fig. 11, 12: *Puya grubbii*; fig. 13: *Puya roseana*; fig.
 14, 15: *Puya membranacea*; fig. 16, 17: *Puya westii*.

Plate II

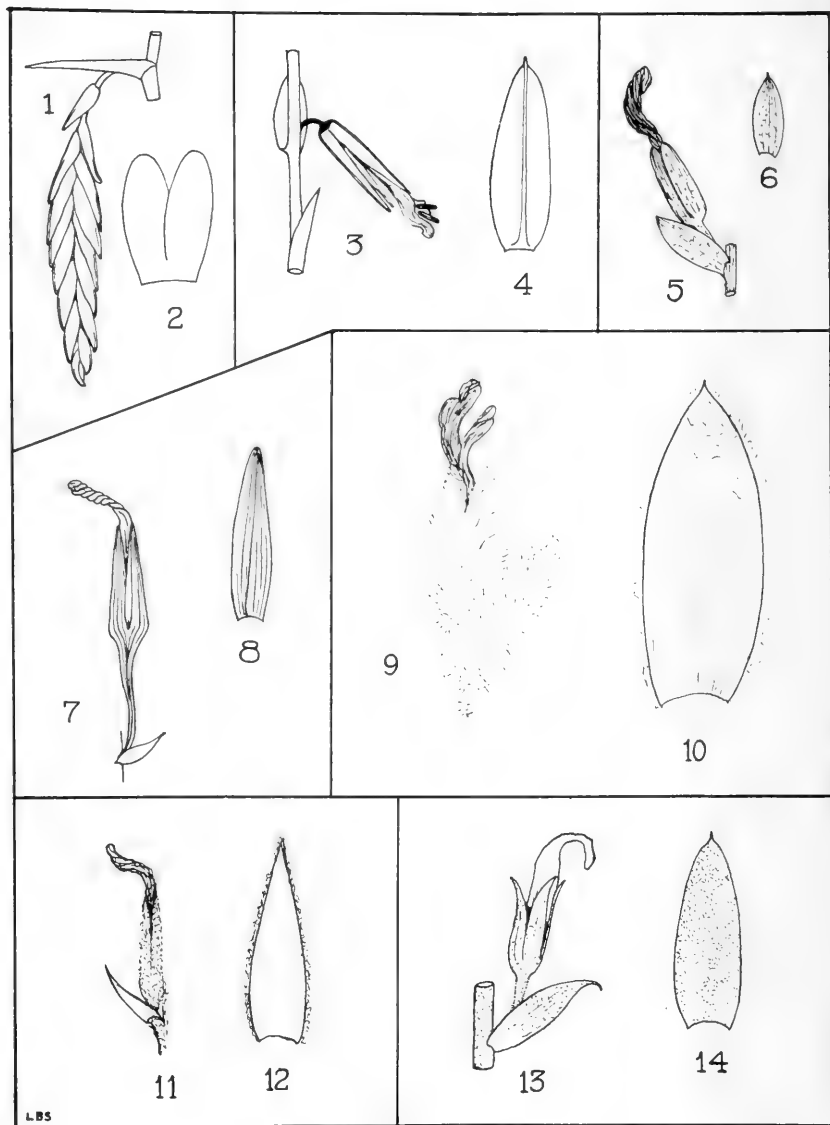


Fig. 1, 2: *Tillandsia somnians*; fig. 3, 4: *Puya alata*; fig. 5, 6: *Puya minima*; fig. 7, 8: *Puya potosina*; fig. 9, 10: *Puya riparia*; fig. 11, 12: *Puya secunda*; fig. 13, 14: *Puya hortensis*.

NOTES ON NEW AND NOTEWORTHY PLANTS. XXVII

Harold N. Moldenke

CALLICARPA DICHOTOMA f. *ALBIFRUCTA* Moldenke, f. nov.

Haec forma a forma typica speciei fructibus albis recedit.

This form differs from the typical form of the species in having white fruits.

The type of the form was collected by M. Togasi (no. 1667) in cultivation at Settsu, Yamamoto, Honshiu, Japan, on September 21, 1957, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

CITHAREXYLUM ROXANAE Moldenke, sp. nov.

Frutex insignis, ramis numerosis gracilibus viridibus valde striatis; internodiis elongatis; foliis anguste lanceolatis integerrimis longe acuminatis, ad basin acutis, utrinque gleberrimis; petiolis gracillimis conspicuis glabris; inflorescentiis racemiformibus paucifloris; fructibus globosis carnosus rubris vel subnigris glabris nitidis.

Shrub 1.5--2 m. tall and about 2 m. in diameter, with many slender branches fanning out from the base; branches, branchlets, and twigs slender, virgate, green, prominently longitudinally striate-ribbed, glabrous throughout; principal internodes very greatly elongated, 3--9 cm. long, somewhat lighter-punctulate between the ribs; nodes annulate; leaves decussate-opposite, rather sparse, apparently caducous; leaf-blades turning reddish when falling, light-green or yellowish-green when fresh, thin-chartaceous or submembranous, 3--6 cm. long, 6--15 mm. wide, long-acuminate at the apex, entire, acute at the base, glabrous on both surfaces; petioles very slender, 6--8 mm. long, glabrous; midrib very slender, very slightly prominulous on both surfaces; secondaries 3--5 per side, very slender, obscure above, flat or obscurely prominulous beneath; veinlet reticulation mostly obscure, not at all prominulous; inflorescence axillary, racemiform, the racemes in fruit 3--5 cm. long, rather few-fruited; peduncles very short, green, striate, and glabrous like the twigs; sympodia very short, green, striate, glabrous; fruiting pedicels about 3 mm. long, green, glabrous, subtended by a scale-like prophyllum about 1 mm. long; fruiting-calyx campanulate, about 3 mm. long and 7 mm. wide, irregularly lobed, glabrous; fruit drupaceous, globose, fleshy, maturing through brick-red to almost black, about 9 mm. long and wide when dry, glabrous, shiny.

The type of this most distinctive species was collected by Annetta Carter and Roxana Ferris -- in whose honor it is named -- (no. 4000), growing with low *Alternanthera*, *Mimosa purpurascens*, *Jatropha vernicosa*, *Euphorbia*, and *Aralia scopulorum* on steep north-facing slope near the crest of the ridge, on the south side of Valle de los Encinos (south side of Cerro Giganta), an an al-

titude of about 1050 meters, latitude about $26^{\circ}3.5'$ N., longitude $111^{\circ}34'$ W., southern Baja California, Mexico, on March 28, 1960, and is deposited in the herbarium of the University of California at Berkeley.

DURANTA REPENS var. *INTEGRIFOLIA* (Tod.) Moldenke, comb. nov.

Duranta integrifolia Tod., Nuov. Gen. & Sp. 27. 1858.

LIPPIA ALBA var. *CARTERAE* Moldenke, var. nov.

Haec varietas a forma speciei typica corollis flavis recedit.

This variety differs from the typical form of the species in having yellow corollas.

The type of the variety was collected by Annetta Carter -- in whose honor it is named -- and Roxana Ferris (no. 3864) in the dry rocky bed of Arroyo Santo Domingo, bordered with *Prosopis*, *Acacia brandegeana*, *Jatropha cinerea*, *Lophocereus schottii*, *Opuntia*, and *Bumelia*, at Rancho El Horno, northeast of San Xavier, Sierra de la Giganta, southern Baja California, Mexico, at an altitude of about 435 meters, latitude about $25^{\circ}53.25'$ N., longitude $111^{\circ}33'$ W., on March 17, 1960, and is deposited in the herbarium of the University of California at Berkeley.

VERBENA CAROLINA f. *ALBIFLORA* Moldenke, f. nov.

Haec varietas a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Stephen S. White (no. 3379) in Cañón de El Temblor, Sonora, Mexico, on August 19, 1940, and is deposited in the herbarium of the University of Michigan at Ann Arbor.

VERBENA LONGIFOLIA f. *ALBIFLORA* Moldenke, f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by B. Hallberg (no. 813) along moist clay banks of a drainage area from cleared cornfield among *Persea* cloud-forests, on the east slopes near Patio de Arena, about 5 km. east of the summit, at about 2900 meters altitude, in the vicinity of Cerro Zampoaltepetl, Oaxaca, Mexico, on August 7, 1950, and is deposited in the herbarium of the University of Michigan at Ann Arbor.

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ADDITIONAL NOTES ON THE GENUS PETREA. VI

Harold N. Moldenke

PETREA ARBOREA H.B.K., Nov. Gen. & Sp. Pl. 2: 282--283 [as "Petraea"]. 1818; Spreng., Syst. Veg. 2: 761. 1825.

Additional synonymy: Petrea arborea Humb. & Bonpl. ex Steud., Nom. Bot., ed. 1, 606. 1821. Petrea arborea Humb. ex Spreng., Syst. Veg. 2: 761. 1825. Petroea arborea H.B.K. ex Neumann, Ann. Fl. Pom. 1837-1838: 254--255. 1838. Petrea erecta Hort. ex Steud., Nom. Bot., ed. 2, 2: 309. 1841. Petrea arborea Kunth ex Schau. in A. DC., Prodr. 11: 619. 1847. Petrea erecta Lodd. ex Schau. in A. DC., Prodr. 11: 619, in syn. 1847. Petrea vincentiana Turcz. ex Moldenke in Fedde, Repert. 43: 25, in syn. 1938. Petraea arborea Kunth ex Moldenke, Prelim. Alph. List Invalid Names 34, in syn. 1940. Petraea arborea L. ex Moldenke, Prelim. Alph. List Invalid Names 34, in syn. 1940. ?Verbena arborea H.B.K. ex Beltrán, Cat. Sem. Hort. Bot. Univ. Valentin. 1948: 26, hyponym. 1948 [not V. arborea Hort., 1959]. Petraea arborea Rich. ex Moldenke, Résumé 330, in syn. 1959.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 282--283. 1818; Steud., Nom. Bot., ed. 1, 606. 1821; Spreng., Syst. Veg. 2: 761. 1825; Lodd., Bot. Cab. 17: pl. 1606. 1830; Neumann, Ann. Fl. Pom. 1837-1838: 254--255. 1838; Steud., Nom. Bot., ed. 2, 2: 309. 1841; Schau. in A. DC., Prodr. 11: 619. 1847; Griseb., Fl. Brit. West Ind. 498. 1861; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 212. 1863; Jacks., Ind. Kew. 2: 478. 1894; Velenovsky, Vergl. Morphol. Pfl. 3: 923 & 1194, pl. 9, fig. 25. 1910; H. J. Lam, Verbenac. Malay. Arch. addenda. 1919; Standl., Contrib. U. S. Nat. Herb. 23: 1237. 1924; Britton & P. Wils., Scient. Surv. Porto Rico 6: 152. 1925; Standl., Contrib. U. S. Nat. Herb. 27: 321--322. 1928; Stapf, Ind. Lond. 5: 39. 1931; Potbury, Carnegie Inst. Wash. Publ. 465: 35, 36, & 79. 1935; Moldenke in Fedde, Repert. 43: 13, 22--26, 209--218, & 220. 1938; Moldenke, Lilloa 4: 308--309. 1939; Moldenke, Geogr. Distrib. Avicenn. 12, 20, 21, & 39. 1939; Moldenke, Alph. List Common Names 5 & 19. 1939; Moldenke, Suppl. List Common Names 23. 1940; Moldenke, Prelim. Alph. List Invalid Names 34--35. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 189--190. 1940; Moldenke in Pulle, Fl. Surin. 4 (2): 290. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 33, 73, & 97. 1942; Moldenke, Alph. List Invalid Names 34--35. 1942; Moldenke, Phytologia 2: 108 (1945) and 2: 173--174. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Beltrán, Cat. Sem. Hort. Bot. Univ. Valentin. 1948: 26. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 57, 61, 64, 66, 162, & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Anal. Inst. Biol. Mex. 22: 421. 1951; Menninger, 1955 Price List n.p. &

12. 1954; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 400 [repr. 19]. 1955; Menninger, 1956 Price List [7]. 1955; Alain in León & Alain, Fl. Cuba 4: 298. 1957; Menninger, 1957 Price List [6] (1957), 1958 Price List [5] (1958), and 1959 Price List [4]. 1958; Moldenke, Résumé 63, 68, 72, 76, 220, 330—333, 335, 357, & 464. 1959.

Illustrations: Lodd., Bot. Cab. 17: pl. 1606 (in color). 1830.

Collectors describe the calyx of this plant as blue-purple or lilac. Menninger says "This Trinidad small evergreen tree, with very rough 4-inch leaves, bears profuse sprays of violet flowers three times a year much like the magnificent Petrea vine we know in Florida. The calyx is a lighter shade of purple than the corolla; the latter soon falls, but the calyx persists, turning ash-gray with age, like some of the people I know. This tree's natural occurrence even in Trinidad is 'extremely rare'. In bloom 'the tree is highly ornamental', wrote Marshall. 'One of the handsomest of Central American plants', wrote Standley, 'because of the abundance of blue flowers'. Standley's plant and the Florida vine referred to here are actually P. volubilis L. Menninger offers P. arborea at the rate of \$2 for 4--6-inch seedlings, or \$3 a foot for 6-inch to 2-foot tall plants.

Wurdack & Monachino describe the species as a shrub 2.5 meters tall, with lavender-purple corollas, the lower lobe white at the base, and the tube white, locally frequent at altitudes of 110--520 meters, flowering in January. Common names recorded for it are "blue-petrea", "blue tree petrea", "blue-wreath", "lilac", "nacareno", "tosatido", "tostadito", and "tree petrea" -- the last of these is applied also to P. kohautiana Presl, while "tostadito" is applied also to P. aspera Turcz.

The Verbena arborea Hort. mentioned in the synonymy above applies to V. litoralis H.B.K. and it is possible that the binomial listed by Beltrán may also belong there. Broadway's initials are consistently reversed to "E. W." for some unknown reason in some herbaria.

Additional citations: TRINIDAD: W. E. Broadway s.n. [June 12th, 1920] (Um--163, Vi, Vi); Fendler 557 (Pa). VENEZUELA: Aragua: Delgado 101 (Ve--12735), 135 (Ve--12732); Vogl 298 (N). Bolívar: Wurdack & Monachino 41293 (N, S). Federal District: Pittier 9449 (Ve--12737). State undetermined: Curran 577 (N). CULTIVATED: Trinidad: W. E. Broadway s.n. [Aug. 27, 1932] (B); Ewan 16990 (Tl).

PETREA ARBOREA var. BROADWAYI Moldenke

Literature: Moldenke in Fedde, Repert. 43: 13, 26, 210, & 212. 1938; Moldenke, Geogr. Distrib. Avicenn. 39. 1939; Moldenke, Alph. List Common Names 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 73 & 97. 1942; Moldenke, Phytologia 2: 108 (1945) and 2: 174. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 51. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 162 & 192. 1949; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 400 [repr. 19]. 1955; Moldenke, Résumé 220 & 464. 1959.

A common name recorded for this variety is "bridal-wreath", which is a name applied also to P. kohautiana var. alba (Freeman &

Williams) Moldenke.

PETREA ASPERA Turcz.

Additional and corrected literature: Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 211. 1863; Jacks., Ind. Kew. 2: 478. 1894; Standl., Contrib. U. S. Nat. Herb. 27: 322. 1928; Moldenke in Fedde, Repert. 43: 14, 201--204, & 210--221. 1938; Moldenke, Geogr. Distrib. Avicenn. 18--20, 22, 26, & 39. 1939; Moldenke, Alph. List Common Names 4, 12, 27, & 33. 1939; Moldenke, Suppl. List Common Names 23. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24, 31--33, 38, 73, & 97. 1942; Moldenke, Phytologia 2: 108 (1945), 2: 174--175 (1946), and 2: 499. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 41, 61, 64, 68, 89, 162, & 192. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Moldenke, Résumé 48, 68, 72, 78, 103, 220, 330, & 464. 1959; Moldenke, Résumé Suppl. 1: 5. 1959.

This plant is described by collectors as a large liana, climbing to 15 meters, or a slender tree, 4--6 meters tall, the inflorescence drooping, from nodes of the older stems, the "flowers" deep-blue, the calyx lavender or the calyx-tube green and the lobes blue, the corolla purple or the lobes bluish-purple.

It has been found at the edge of woods, at altitudes of 30 to 720 meters, blooming from February to June and in November, in fruit in February, June, and July. Wurdack & Monachino report it occasional in forests. Additional common names are "primavera" and "tostadito", the latter being a name also applied to P. arborea H.B.K. The label of Ll. Williams 11475 actually gives the name P. arborea H.B.K. as a synonym of this species, which is entirely incorrect. The two species are actually very distinct from each other.

Additional citations: PANAMA: Canal Zone: P. H. Allen 960 (E--1121191, N, S); F. H. Elmore L.41 (M1); Moldenke & Moldenke 19800 [Barro Colorado Island] (Es, Lg, N, N, Ot, Sm). Panamá: P. H. Allen 658 (E--1121306); Hunter & Allen 658 (N, S). COLOMBIA: Antioquia: Haught 4791 (N). Bolívar: Sneider 5765 (S). VENEZUELA: Aragua: Vogl 299 (N); Ll. Williams 10077 (Ve--12748), 10160 (Ve--12747). Bolívar: Ll. Williams 11475 (Ca--734087, Ew, Ve--12749). Carabobo: Tamayo 2223 (Ve--12741). Delta Amacuro: Wurdack & Monachino 39641 (N). Miranda: Aristeguieta 2868 (N). Yaracuy: Killip 37068 (N). BRAZIL: Matto Grosso: J. G. Kuhlmann 1295 (Sp--31977).

PETREA ATROCOERULEA Moldenke

Literature: Moldenke in Fedde, Repert. 43: 16, 195--197, 210, 216, & 218--220. 1938; Moldenke, Geogr. Distrib. Avicenn. 19, 23, & 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 35, 38, & 97. 1942; Moldenke, Phytologia 2: 175. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 73, 89, & 192. 1949; Moldenke, Résumé 68, 84, 103, & 464. 1959.

Schultes describes this plant as a frail treelet with blue bracts, and found it at about 100 meters altitude.

Additional citations: COLOMBIA: Amazonas: R. E. Schultes 6063 (W--1988458).

PETREA BLANCHETIANA Schau.

Additional synonymy: Petraea blanchetiana Schau. ex Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 158. 1894. Petraea latifolia P. DC. apud E. J. Salisb., Ind. Kew. Suppl. 10: 168, in syn. 1947.

Literature: Schau. in A. DC., Prodr. 11: 617--618. 1847; Schau. in Mart., Fl. Bras. 9: 273 & 307, pl. 45, fig. 1. 1851; Jacks., Ind. Kew. 2: 478. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 158. 1894; Stapf, Ind. Lond. 5: 39. 1931; Moldenke in Fedde, Repert. 43: 14, 166--168, 210--214, & 217--220. 1938; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Prelim. Alph. List Invalid Names 34. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 97. 1942; Moldenke, Alph. List Invalid Names 34. 1942; Moldenke, Phytologia 2: 175. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 50. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89 & 192. 1949; Moldenke, Résumé 103, 330--332, & 464. 1959.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 45, fig. 1. 1851.

PETREA BRACTEATA Steud., Flora 26: 764 [as "Petraea"]. 1843;

Schau. in A. DC., Prodr. 11: 620. 1847.

Additional synonymy: Petraea bracteata H.B.K. ex Moldenke, Prelim. Alph. List Invalid Names 34, in syn. 1940. Petraea schomburgkiana Schau. ex Moldenke, Prelim. Alph. List Invalid Names 34, in syn. 1940. Petraea bracteosa Steud. apud E. J. Salisb., Ind. Kew. Suppl. 10: 168, in syn. 1947. Petraea reticulata L. C. Rich. apud E. J. Salisb., Ind. Kew. Suppl. 10: 168, in syn. 1947.

Additional and corrected literature: Steud., Flora 26: 764. 1843; Schau. in A. DC., Prodr. 11: 617 & 619--620. 1847; Miq., Stirp. Surinam. [Nat. Verh. Holl. Maatsch. Wet. Haarlem, ser. 2, 7:] pl. 42. 1850; Jacks., Ind. Kew. 2: 478. 1894; H. H. Rusby, Mem. Torrey Bot. Club 6: 106. 1896; H. H. Rusby, Bull. Torrey Bot. Club 27: 81. 1900; Buchtien, Contrib. Fl. Bolivia 1: 166. 1910; Glück, Blatt- & Blütenmorphol. Stud. 382. 1919; Stapf, Ind. Lond. 5: 39. 1931; Moldenke, Phytologia 1: 17. 1933; Moldenke in Fedde, Repert. 43: 14, 161--164 & 210--221. 1938; Moldenke, Alph. List Common Names 14, 24, 25, & 27. 1939; Moldenke, Geogr. Distrib. Avicenn. 21, 22, & 26. 1939; Moldenke in Pulle, Fl. Surin. 4 (2): 287--290. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 38, & 97. 1942; Moldenke, Phytologia 2: 108 (1945) & 2: 175--176. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Phytologia 2: 499. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 52 & 82. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 66--68, 89, & 192. 1949; H. N. & A. L. Mol-

denke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 72, 76--78, 103, 331, 332, & 464. 1959.

Illustrations: Glück, Blatt- & Blütenmorphol. Stud. 382. 1919.

Collectors describe this plant as a shrub to 2 meters tall, a scandent shrub, or a woody vine climbing to 30 meters, the bracts pale-purple, the flowers royal blue-purple, dark-blue, or red, the calyx lilac or lavender, the corolla purple, deep-purple, or blue. It has been found in woods on terra firma, on granitic monadnocks, in the lowlands on the border of rivers of whitish water, and "beira da mata da terra alta". Maguire says that he found it "infrequent in high forest", while Maguire & Cowan report it as "occasional in forest". On the other hand, Cowan & Lindeman say that it is "frequent in trees along riverbank clearings, forested slopes, and summits". It has been collected at altitudes of 100 to 500 meters.

The Fröes 22628 collection has deeply bullate leaves, while Murça Pires 3622 has amazingly thin and smoothish leaves. Either the species is remarkably variable or else several species are involved, as Schauer believed. If the latter is true, I have as yet been unable to ascertain the characters by which they may be distinguished. The "Collector undesignated 1708", cited by me on page 164 of my monograph, is Kappler 1708 according to Pulle, Enum. Pl. Surin. 402 (1906). Common names for the species include "hajariballi", "hayariballi", "sandpaper vine", and "sandpaper-vine" -- the last-mentioned being applied also to P. volubilis L.

Additional citations: VENEZUELA: Amazonas: Level 5 (N); Maguire, Cowan, & Wurdack 30444 (N, S); Wurdack & Adderley 43583 (N, S). BRITISH GUIANA: Appun s.n. [1872] (N); B. Maguire 40506 (N); Maguire & Cowan 39297 (N), 39344 (N). SURINAM: "B. W.", Bureau of Forestry 5111 [32] (N); Cowan & Lindeman 39221 (N, S); Florschütz & Florschütz 1127 (N); Lanjouw & Lindeman 1971 (N). BRAZIL: Amapá: Black 49-8434 (Be--53786). Amazonas: Collector undesignated 2 [Herb. Inst. Nac. Pesq. Amaz. 803] (Ok); Ducke 872 (Be--10446), 1133 (Be--10154), 2321 (Z); Francisco & Lewis s.n. [Herb. Inst. Nac. Pesq. Amaz. 3529] (Ok); Fröes 22628 (Be--32426, N). Guaporé: N. T. da Silva 446 (N). Pará: Murça Pires 3622 (Cb, N, Ss). CULTIVATED: Brazil: Ducke s.n. [19-4-1941] (Be--43395).

PETREA BREVICALYX Ducke, Bull. Mus. Hist. Nat. Paris, sér. 2, 4: 748--749 [as "Petraea"]. 1932; J. A. Clark, Card Ind. 1933.

Additional and corrected synonymy: Petraea kuhlmannii Moldenke ex F. C. Hoehne, Resen. Hist. Sec. Bot. Inst. Biol. São Paulo 153 & 163, hyponym. 1937. Petraea kuhlmannia Moldenke in Fedde, Rept. 43: 18, in syn. 1938. Petrea kuhlmannii Moldenke in Fedde, Rept. 43: 20, in syn. 1938.

Additional and corrected literature: Ducke, Bull. Mus. Hist. Nat. Paris, sér. 2, 4: 748--749. 1932; Ducke, Archiv. Jard. Bot. Rio de Jan. 6: 87--88. 1933; F. C. Hoehne, Resen. Hist. Sec. Bot. Inst. Biol. São Paulo 153 & 163. 1937; Hill, Ind. Kew. Suppl. 9:

209. 1938; Moldenke in Fedde, Repert. 43: 14, 18--20, 210, 213, 216, 217, & 220. 1938; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 97. 1942; Moldenke, Phytologia 2: 176. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 67. 1948; Occhioni, Lilloa 17: 484. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89 & 192. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Moldenke, Résumé 103, 330--332, 422, & 464. 1959.

Collectors describe this species as a vine, the calyx dark-violet, and the corolla violet. It has been collected in anthesis in February, March, and November. Ducke calls it "cipó pequeno", growing in the "mata" and "igapó". A vernacular name recorded for it is "viuvinha", but this name is also applied to P. insignis Schau., P. racemosa Nees, P. martiana Schau., and P. amazonica Moldenke.

Occhioni, in the reference cited above, claims that Herb. Rio de Jan. 22544 is the type collection of P. brevicalyx, but actually it is only one of two cotype collections. The fragment of this collection, cited on page 20 of my monograph as deposited in the Britton Herbarium at New York, is now in the herbarium of Cornell University (It).

The species has occasionally been misidentified in herbaria as P. insignis.

Additional citations: BRAZIL: Amazonas: Ducke II.140 (Be--9841); Fröes 20501 (Be--16261, N); Herb. Inst. Nac. Pesq. Amaz. 3587 (Z); J. G. Kuhlmann 2276 (Sp--31995). CULTIVATED: Brazil: Herb. Inst. Nac. Pesq. Amaz. 3349 (Ok).

PETREA COLOMBIANA Moldenke

Literature: Moldenke in Fedde, Repert. 43: 15, 174--176, 210, 216, & 219. 1938; Moldenke, Geogr. Distrib. Avicenn. 19 & 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 73, & 97. 1942; Moldenke, Phytologia 2: 176--177. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 162, & 192. 1949; Moldenke, Résumé 68, 220, & 464. 1959.

PETREA DUCKEI Moldenke

Literature: Moldenke, Phytologia 1: 469--470. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 97. 1942; Moldenke, Phytologia 2: 177. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 57. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89 & 192. 1949; Moldenke, Résumé 103 & 464. 1959.

This species has been collected in anthesis in February, March, and July, and has been found on flooded land and low ground along the margins of rivers. It is described as a vine with lilac calyx and violet corollas. It has been confused in herbaria with P. swallenii Moldenke and P. insignis Schau., with which species and with P. riparia Moldenke it is certainly closely related.

Additional citations: BRAZIL: Amapá: Fröes 25774 (N). Amazonas: Ducke 688 (Be—10314); Fröes 22440 (Be—28974, N).

PETREA GLANDULOSA Pittier, Bol. Cienc. & Tecn. Mus. Com. Venez. 1: 70 [as "Petraea"]. 1925; Hill, Ind. Kew. Suppl. 7: 183. 1929.

Additional and corrected literature: Pittier, Bol. Cienc. & Tecn. Mus. Com. Venez. 1: 70. 1925; Hill, Ind. Kew. Suppl. 7: 183. 1929; Moldenke in Fedde, Repert. 43: 14, 176—177, 210, & 218. 1938; Moldenke, Geogr. Distrib. Avicenn. 20. 1939; Moldenke, Suppl. List Common Names 17. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 97. 1942; Moldenke, Phytologia 2: 177—178. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 64 & 192. 1949; Moldenke, Résumé 72, 331, & 464. 1959.

Bernardi describes this species as an upright tree, with rough leaves and white calyxes, blooming in June.

Additional citations: VENEZUELA: Mérida: Bernardi 3331 (N).

PETREA INSIGNIS Schau.

Additional literature: Schau. in A. DC., Prodr. 11: 620. 1847; Schau. in Mart., Fl. Bras. 9: 276—277 & 307, pl. 46, fig. 2. 1851; Jacks., Ind. Kew. 2: 478. 1894; Stapf, Ind. Lond. 5: 39. 1931; Moldenke in Fedde, Repert. 43: 14, 20—22, 210, 212, 213, 217, 219, & 220. 1938; Moldenke, Geogr. Distrib. Avicenn. 26 & 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38, 73, & 97. 1942; Moldenke, Phytologia 2: 178. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89, 162, & 192. 1949; Moldenke, Résumé 103, 221, 331, 332, & 464. 1959.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 46, fig. 2. 1851.

Collectors describe this plant as a liana. It has sometimes been confused in herbaria with P. duckei Moldenke. The common names "flor de S. Miguel" and "viuvinha", recorded for this species, apply also to P. racemosa Nees, while the second is applied also to P. brevicalyx Ducke.

Additional citations: BRAZIL: Amazonas: Fröes 29568 (Be—79649, Z).

PETREA KOHAUTIANA Presl

Additional synonymy: Petraea volubilis L. ex Jacq., Select. Stirp. Amer. Hist. 180—181. 1763. Petraea volubilis Jacq. ex Moldenke, Prelim. Alph. List Invalid Names 35, in syn. 1940 [not P. volubilis L., 1753]. Petraea volubilis Griseb. ex Box, Fl. Antigua mss., in syn.; Moldenke, Résumé 333, in syn. 1959.

Additional and corrected literature: L., Hort. Cliff. 319. 1737; L., Sp. Pl., ed. 1, 626. 1753; Jacq., Select. Stirp. Amer. Hist. 180—181, pl. 114. 1763; Jacq., Select. Stirp. Amer. Hist. Picta pl. 173. 1780; Jacq., Icon. Select. Stirp. Amer. pl. 114.

1797; Presl, Bot. Bemerk. 99. 1844; Ettingsh., Blatt-Skel. Dikot. 79, pl. 28, fig. 3. 1861; Norton, Brazil. Fl. pl. 49. 1893; Jacks., Ind. Kew. 2: 478. 1894; Britton & P. Wils., Scient. Surv. Porto Rico 6: 152 (1925) & 370. 1926; Stapf, Ind. Lond. 5: 39. 1931; Potbury, Carnegie Inst. Wash. Publ. 465: 35, 36, & 79. 1935; Moldenke in Fedde, Repert. 43: 13, 15, 16, 26--31, & 209--221. 1938; Moldenke, Geogr. Distrib. Avicenn. 9--11 & 39. 1939; Moldenke, Alph. List Common Names 3, 19, 25, 27, & 33. 1939; Moldenke, Suppl. List Common Names 23. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 28, 29, 73, & 97. 1942; Moldenke, Phytologia 2: 178--179 (1946) and 2: 501. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 67. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 48, 51, 53--56, 162, & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Menninger, 1954 Price List 5 & [11]. 1954; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 400 [repr. 19]. 1955; Moldenke, Résumé 57, 60--62, 221, 234, 331--333, & 464. 1959.

Illustrations: Jacq., Select. Stirp. Amer. Hist. 180--181, pl. 114. 1763; Jacq., Select. Stirp. Amer. Hist. Picta pl. 173. 1780; Jacq., Icon. Select. Stirp. Amer. pl. 114. 1797; Ettingsh., Blatt-Skel. Dikot. 79, pl. 28, fig. 3. 1861; Norton, Brazil. Fl. pl. 49. 1893.

Additional common names recorded for this plant are "big petrea", "purple-wreath", and "purplewreath". The name "liane rude", recorded previously for it, applies also to P. volubilis L. The Hodges state on their label "fls. deep purple, involucre lavender". Beard found the species growing in secondary forests. Menninger says of it "Rated by Chittenden as far superior to the commoner P. volubilis, this South American vine has 12-inch clusters of blue flowers." He offers 8--10-inch plants for \$15 each. Actually, the species is West Indian, not South American. The Beaupertuis s.n. [1839] cited from Paris by me on page 30 of my monograph is now in the Berlin herbarium.

Additional citations: LEEWARD ISLANDS: Dominica: P. Beard 11475 (N, S); Hodge & Hodge 3016 (Ms); R. A. Howard 11757 (N). WINDWARD ISLANDS: Martinique: Fée s.n. [1832] (Br); Hahn 270 (B); Sieber, Fl. Mart. 157 (B--isotype, B--isotype); Stehlé 5762 (Vi). St. Lucia: P. Beard 1071 (S). LOCALITY OF COLLECTION UNDETERMINED: Ponthieu s.n. [1778] (S).

PETREA KOHAUTIANA var. ALBA (Freeman & Williams) Moldenke

Additional synonymy: Petrea alba Hort. apud E. J. Salisb., Ind. Kew. Suppl. 10: 168, in syn. 1947.

Additional and corrected literature: Moldenke in Fedde, Repert. 43: 15, 31--32, 211, 212, 217, & 220. 1938; Moldenke, Geogr. Distrib. Avicenn. 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 73 & 97. 1942; Moldenke, Phytologia 2: 179. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 162 & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 221, 330, 332, 333, & 464. 1959.

PETREA LONGIFOLIA Moldenke

Additional and corrected literature: Moldenke in Fedde, Repert. 43: 16, 197--199, 211, & 215. 1938; Moldenke, Geogr. Distrib. Avicenn. 41. 1939; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 75 & 97. 1942; Moldenke, Phytologia 2: 179. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 166 & 192. 1949; Moldenke, Résumé 226, 331, & 464. 1959.

PETREA MACROSTACHYA Benth., Ann. Nat. Hist., ser. 1, 2: 448 [as "Petraea"]. 1839; Schau. in A. DC., Prodr. 11: 617. 1847.

Additional synonymy: Petrea guianensis Kunth ex Steud., Nom. Bot., ed. 2, 2: 309. 1841. Petrea volubilis var.? guianensis Cham. ex Steud., Nom. Bot., ed. 2, 2: 309. 1841. Petrea (volubilis?) guianensis Cham. ex Schau. in A. DC., Prodr. 11: 617, in syn. 1847. Petraea guyanensis Cham. ex Moldenke, Alph. List Invalid Names 18, in syn. 1947. Petrea volubilis var. guyanense Cham. ex Moldenke, Résumé 333, in syn. 1959.

Illustrations: Miq., Stirp. Surin. [Nat. Verh. Holl. Maatsch. Wet. Haarlem, ser. 2, 7:] pl. 42. 1850.

Additional and corrected literature: Cham., Linnaea 7: 367. 1832; Benth., Ann. Nat. Hist., ser. 1, 2: 448. 1839; Steud., Nom. Bot., ed. 2, 2: 309. 1841; Schau. in A. DC., Prodr. 11: 617. 1847; Schau. in Mart., Fl. Bras. 9: 273. 1851; Jacks., Ind. Kew. 2: 478. 1894; Stapf, Ind. Lond. 5: 39. 1931; Moldenke in Fedde, Repert. 43: 15, 204--206, 210--212, & 216--220. 1938; Moldenke, Geogr. Distrib. Avicenn. 21, 22, & 26. 1939; Moldenke, Alph. List Common Names 22. 1939; Moldenke in Pulle, Fl. Surin. 4 (2): 290. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 38, & 97. 1942; Moldenke, Phytologia 2: 179--180. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; Moldenke, Phytologia 2: 499 & 501. 1948; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 66, 68, 89, & 192. 1949; Moldenke, Résumé 76, 78, 84, 103, 331--333, & 464. 1959.

Collectors describe this plant as a scandent shrub or liana, with pendent inflorescences, the "flowers" blue, blue-purple, or violet. Black says "flor (petales e calice) azul flor sendo contudo mais profundamente azul". It has been found in woods on high land and in forests along riverbanks. Ducke found it in "mata de terra retas". It has also been collected in anthesis in May, October, and November, and a common name is "murititica".

Additional citations: BRAZIL: Amapá: Cowan 38577 (N). Amazonas: Ducke 1982 (Be--20109, N); Fróes 21121, in part (N). Pará: Black 48-2954 (Be--36855, N). PERU: Loreto: Asplund 44058 (S).

PETREA MARTIANA Schau.

Additional synonymy: Petraea martiana Schau. ex LeCointe, Amaz. Brasil. III Arv. & Pl. Uteis 470. 1934.

Additional and corrected literature: Schau. in A. DC., Prodr. 11: 620. 1847; Schau. in Mart., Fl. Bras. 9: 276 & 307, pl. 46,

fig. 1. 1851; Jacks., Ind. Kew. 2: 478. 1894; Stapf, Ind. Lond. 5: 39. 1931; Moldenke in Fedde, Repert. 43: 14, 164--166, 210, 213, 215, & 217. 1938; Moldenke, Geogr. Distrib. Avicenn. 24 & 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 38, & 97. 1942; Moldenke, Phytologia 2: 180. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; H. N. & A. L. Moldenke, Fl. Life 2: 71. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 89, & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 84, 103, 331--333, & 464. 1959.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 46, fig. 1. 1851.

Collectors describe this plant as a liana, growing in the high woods. A common name, "viuvinha", is recorded, but this name is also applied to P. brevicalyx Ducke, P. insignis Schau., and P. racemosa Nees.

Additional citations: PERU: Loreto: Murça Pires & Black 1050 (Be--18031). BRAZIL: Amazonas: Fróes 21121, in part (Be--16480).

PETREA MAYNENSIS Huber

Additional and corrected literature: Huber, Bol. Mus. Para. 4: 602. 1906; Prain, Ind. Kew. Suppl. 4: 177. 1913; Moldenke in Fedde, Repert. 43: 14, 199--201, 210, 211, 215, 216, & 218--221. 1938; Moldenke, Geogr. Distrib. Avicenn. 19, 24, 26, 28, & 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 35, 38, 40, 73, & 97. 1942; Moldenke, Phytologia 2: 180--181. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Phytologia 2: 500--501. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 73, 89, 97, 162, & 192. 1949; Moldenke, Résumé 68, 84, 103, 114, 221, 332, & 464. 1959.

Collectors describe this plant as a bush or shrub, 1.5--3 m. tall, varying to a small shrubby tree or scandent, found in semi-shade at altitudes of 150 to 550 meters, the calyx violet and the corolla deep-purple. Sandeman says that it has "pale lilac bracts", while Ducke reports "flor lilaz até violaceo-clara". He also says that it is frequently cultivated in Belém. It has been collected in anthesis also in February.

Additional citations: COLOMBIA: Amazonas or Vaupés: Schultes & Cabrera 13591 (Ss). Meta: Sandeman 5783 (K). PERU: Huánuco: Ferreyra 8100 (W--2028610). Loreto: Ferreyra 10165 (Z). BOLIVIA: El Beni: H. H. Rusby 932 (Du--382228, Pa), 933 (Pa). La Paz: M. Bang 1480 (Pa); Krukoff 10729 (S). CULTIVATED: Brazil: Ducke s.n. [25-8-1941] (Be--43396).

PETREA NITIDULA Moldenke

Literature: Moldenke in Fedde, Repert. 43: 15, 168--170, 210, 213, & 220. 1938; Moldenke, Geogr. Distrib. Avicenn. 24 & 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 38, & 97. 1942; Moldenke, Phytologia 2: 181. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 89, & 192. 1949; Moldenke, Résumé 84, 103, & 464. 1959.

PETREA PERPLEXANS (Cockerell) MacGinitie, Carnegie Inst. Wash.

Publ. 599: 18, 39, 158, 168, & 194, pl. 51, fig. 4, & pl. 74, fig. 5. 1953.

Synonymy: Buettneria (?) perplexans Cockerell, Bull. Am. Mus. Nat. Hist. 24: 104, pl. 10, fig. 39. 1908. Carpolithes macrophyllus Cockerell, Torreya 11: 235, fig. 1. 1911.

Literature: Cockerell, Bull. Am. Mus. Nat. Hist. 24: 104, pl. 10, fig. 39. 1908; Cockerell, Torreya 11: 235, fig. 1. 1911; MacGinitie, Carnegie Inst. Wash. Publ. 599: 18, 39, 158, 168, & 194, pl. 51, fig. 4, & pl. 74, fig. 5. 1953; Moldenke, Résumé 226, 240, 249, 331, & 464. 1959.

Illustrations: Cockerell, Bull. Am. Mus. Nat. Hist. 24: pl. 10, fig. 39. 1908; Cockerell, Torreya 11: 235, fig. 1. 1911; MacGinitie, Carnegie Inst. Wash. Publ. 599: pl. 51, fig. 4, & pl. 74, fig. 5. 1953.

Known only from the flowers and fruit: calyx firm-textured, 5- (or rarely 4-) lobed, the lobes long-ovate or oblong, about 16 mm. long and 3.5 mm. wide, acute at the apex, their venation comprising a strong midrib closely flanked by a pair of short primaries which disappear through branching and anastomosing, the midrib giving rise to approximately ten pairs of opposite or subopposite secondaries which originate at 40--50° from the midrib, branched 1--3 times and forming a coarse mesh along the margins of the lobes; fruit a rounded or short-ovoid nutlet or indehiscent capsule with delicate longitudinal ridges.

The type of this species was collected in the Florissant beds, Station 14 (Rohwer), in the Miocene formations of Colorado, in 1906. MacGinitie designated two new hypotypes, which are University of California Museum of Paleobotany series numbers 3622 and 3875, also from the Florissant beds of Colorado. He points out that these calyxes may be distinguished from those of Astronium by the predominantly pinnate venation of the lobes. They match quite well those seen in the modern P. volubilis L. (referred to in error by MacGinitie as P. arborea). He states further that the Engelhardtia oxyptera Saporta as reported by Lesquereux in Rep. U. S. Geol. Surv. Terr. 8: 192 (1883) is probably also a species of Petrea, but is discarded because of the lack of a published figure. There are two other species of Petrea known from the fossil state; the others being P. borealis Ettingsh. from the Miocene of Czechoslovakia and P. rotunda Potbury from the Eocene or Lower Oligocene of California.

PETREA PERUVIANA Moldenke

Synonymy: Petraea peruviana Moldenke in Fedde, Repert. 43: 206, in syn. 1938.

Literature: Schau. in A. DC., Prodr. 11: 619. 1847; Jacks., Ind. Kew. 2: 478. 1894; Moldenke in Fedde, Repert. 43: 15, 206--208, 210, 216, & 217. 1938; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Prelim. Alph. List Invalid Names 34. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 97. 1942; Moldenke, Alph. List Invalid Names 34. 1942; Moldenke, Phytologia 2:

108. 1945; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 73, & 192. 1949; Moldenke, Résumé 68, 84, 331, 333, & 464. 1959.

A common name recorded for this plant is "sanango sacha". It ascends to 300 meters altitude in Vaupés.

Additional citations: COLOMBIA: Vaupés: Gutiérrez Villegas & Schultes 760 (Fn, N, N, S), 781 (Fn, N), 783 (Fn).

PETREA PUBESCENS Turcz.

Synonymy: Petraea pubescens Turcz. ex Moldenke in Fedde, Repert. 43: 170, in syn. 1938. Petraea velutina Pittier ex Moldenke in Fedde, Repert. 43: 170, in syn. 1938.

Additional and corrected literature: Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 211--212. 1863; Jacks., Ind. Kew. 2: 478. 1894; Moldenke in Fedde, Repert. 43: 14, 170--172, 210--214, & 216--220. 1938; Moldenke, Geogr. Distrib. Avicenn. 19, 20, 22, 26, & 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, 34, 38, 73, & 97. 1942; Moldenke, Phytologia 2: 108 (1945) and 2: 181. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Phytologia 2: 500 & 502. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 64, 70, 73, 89, 162, & 192. 1949; Moldenke, Résumé 68, 72, 80, 84, 103, 221, 331, 333, & 464. 1959; Moldenke, Résumé Suppl. 1: 5. 1959.

One of the Hanbury-Tracy 136 specimens cited by me in Phytologia 2: 502 (1948) as in the Kew (K) herbarium is now in the Britton Herbarium (N) at New York.

Aristeguieta describes the species as a tree 10 meters tall, with a white calyx and pale-purple corollas, blooming in April, and called "penitente".

Additional citations: COLOMBIA: Antioquia: Toro Toro 242 (Fn--1649). Cundinamarca: H. García y Barriga 12344 (N). VENEZUELA: Barinas: Aristeguieta 3864 (N). Carabobo: Saer 831 (Ve--12739). Lara: Tamayo 3332 (Ve), 3383 (Ve). Táchira: Aristeguieta & Agostini 4113 (Z); H. García y Barriga 13314 (W--1987236). State undetermined: Chardon 20 (Ve--12730). CULTIVATED: Venezuela: Pittier 8774 (Ve--12738).

PETREA PUBESCENS var. KLUGII Moldenke

Literature: Moldenke in Fedde, Repert. 43: 15, 172--173, 210, & 216. 1938; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 97. 1942; Moldenke, Phytologia 2: 181. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 67. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73 & 192. 1949; Moldenke, Mem. N. Y. Bot. Gard. 9: 177. 1955; Moldenke, Résumé 80, 84, & 464. 1959.

Camp describes this as a woody plant with a pale-violet calyx and deep-violet corolla, found on uplands at 1900 feet altitude, blooming in December.

Additional citations: ECUADOR: Santiago-Zamora: Camp E.1450

(N). PERU: San Martín: Klug 4155 (Ca--709772--isotype).

PETREA RACEMOSA Nees, Flora 4 (1): 300 [as "Peraea"] & 330. 1821.

Additional synonymy: Petrea subserrata Cham. apud Steud., Nom. Bot., ed. 2, 2: 309. 1841. Petrea volubilis Arrab. apud Presl, Bot. Bemerk. 99. 1844. Petraea racemosa Nees ex Moldenke in Fedde, Repert. 43: 179, in syn. 1938; Hill, Ind. Kew. Suppl. 9: 209. 1938. Petrea subserrata Cham. & Schlecht. ex Moldenke, Prelim. Alph. List Invalid Names 35, in syn. 1940. Petraea subserrata Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 18, in syn. 1947. Petrea semiserrata Sydow apud E. J. Salisb., Ind. Kew. Suppl. 10: 168, in syn. 1947. Petrae racemosa Nees ex F. C. Hoehne, Relat. Annual Inst. Bot. S. Paulo 1951: 100, sphalm. 1955.

Additional and corrected literature: L., Sp. Pl., ed. 1, 626. 1753; Sim in Curtis, Bot. Mag. 17: pl. 628. 1803; Mirb., Hist. Nat. Pl. 15: pl. 104. 1805; Nees, Flora 4 (1): 300 & 330. 1831; Schrad., Götting. Gel. Anz. 1821: 712. 1821; Wied-Neuwied, Reise Bras. 1: 358 & 2: 342. 1821; Nees, Nov. Act. Physico-med. Acad. Caes. Leopold.-Car. Nat. Cur. 11: 72--73. 1823; Lodd., Bot. Cab. 8: pl. 736. 1823; Vell., Fl. Flum. 254 (1825) and Icon. 6: pl. 59. 1827; Cham., Linnaea 7: 368--370. 1832; Gêel, Sert. Bot. 3, cl. 14. 1832; Knowles & Westc., Floral Cab. 3: pl. 104. 1840; Steud., Nom. Bot., ed. 2, 2: 309. 1841; Presl, Bot. Bemerk. 99. 1844; Schau. in A. DC., Prodr. 11: 618. 1847; Schau. in Mart., Fl. Bras. 9: 274--277 & 307, pl. 45, fig. 2. 1851; Hortie. Franç. 1858: pl. 6. 1858; Bocq., Adansonia 3 [Rev. Verbenac.]: pl. 20. 1863; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 211. 1863; Balfe, Garden 12: 40. 1877; Journ. Hort., ser. 3, 7: 53. 1883; Wittm., Gart.-Zeit. Berlin 3: 277. 1883; Jacks., Ind. Kew. 2: 478. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 157, fig. 60 k & l. 1894; Bois, Dict. Hort. 944. 1893--1899; L. H. Bailey, Cycl. Amer. Hort. 4: 1284. 1901; Gard. Chron., ser. 3, 39: 23. 1906; Journ. Hort., ser. 3, 54: 390. 1907; Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 296. 1908; Gard. Chron., ser. 3, 51: 287. 1912; L. H. Bailey, Stand. Cycl. Hort. 5: 2562. 1916; Stapf, Ind. Lond. 5: 39. 1931; Crevost & Pételot, Bull. Econom. Indo-chine 37: 1289. 1934; N. K. Gould, Journ. Roy. Hort. Soc. Lond. 61: 519. 1936; Gard. Chron., ser. 3, 102: 42. 1937; Moldenke in Fedde, Repert. 43: 13, 16, 179--188, & 210--221. 1938; Moldenke, Cult. Pl. 35. 1938; Hill, Ind. Kew. Suppl. 9: 209. 1938; Moldenke, Geogr. Distrib. Avicenn. 26, 28, & 39. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38, 41, 74, & 97. 1942; Moldenke, Phytologia 2: 182--183. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Kuhlmann & Kühn, Flor. Distr. Ibiti 116 & 181--182. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; Moldenke, Phytologia 2: 500. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89, 99, 162, & 192. 1949; Stellfeld, Trib. Farmac. 19 (10): 169 & 172. 1951; F. C. Hoehne, Relat. Annual Inst. Bot. S. Paulo 1951: 100. 1955; L. Traveso Filho, Flores do Brasil 2: 1 & 30. 1955; Moldenke, Résumé

mé 103, 117, 221, 329--333, & 464. 1959; Reitz, Sellowia 11: 76 & 121. 1959; Angely, Fl. Paran. 16: 68. 1960; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960.

Additional and corrected illustrations: Sim in Curtis, Bot. Mag. 17: pl. 628 (in color). 1803; Mirb., Hist. Nat. Pl. 15: pl. 104. 1805; Lodd., Bot. Cab. 8: pl. 736. 1823; Vell., Fl. Flum. Icon. 6: pl. 59. 1827; Gél., Sert. Bot. 3, cl. 14. 1832; Knowles & Westc., Floral Cab. 3: pl. 108. 1840; Hort. Franç. 1858: pl. 6. 1858; Bocq., Adansonia 3 [Rev. Verbenac.]: pl. 20. 1863; Balfe, Garden 12: 40 (in color). 1877; Journ. Hort., ser. 3, 7: 53. 1883; Bois, Dict. Hort. 944. 1893--1899; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 157, fig. 60 k & l. 1894; L. H. Bailey, Cycl. Amer. Hort. 4: 1284. 1901; Gard. Chron., ser. 3, 39: 24. 1906; Journ. Hort., ser. 3, 54: 390. 1907; Gard. Chron., ser. 3, 51: 287. 1912; L. H. Bailey, Stand. Cycl. Hort. 5: 2562. 1916; L. Travesso Filho, Flores do Brasil 2: 1. 1955.

Rambo comments that this species is not known from Rio Grande do Sul, which is correct, but it is known from Paraná and Santa Catarina. It is described as a shrub or as scandent or subscandent, inhabiting the "mata", woods, and thickets, or "capoeira e margem de correios". The flowers are said to be blue or violet, and the species has been collected in anthesis from August to November. The N. Y. Bot. Gard. Cult. Pl. 3833l, cited below, was grown from seed said to have come from Puerto Rico in 1913.

Petrea denticulata Schrad. is erroneously reduced to Cordia americana Steud. (Patagonula americana L.) by Steudel, Nom. Bot., ed. 2, 2: 309 (1841).

Common names recorded for the species include "cambará-de-lixa", "capela de viuva", "capela-de-viuva", "cipó azul", "cipó de S. Miguel", "corôa de viuva", "flor de São Miguel", "flôr de São Miguel", "flor de viuca", "flôr de viuva", "lixreira", "touca-de-viuva", "touca de viúva", "violeta", and "viuvinha".

Additional citations: BRAZIL: Minas Gerais: Brade 15946 (B); P. Clausen s.n. [Aug.-April 1840] (Br); Heringer 428 (Sp-44607); Macedo 6 (Sp-49431), 1987 (N, S); Mendes Magalhaes 4257 [Herb. Jard. Bot. Belo Horiz. 45576] (N, Qu). Paraná: Hatschbach 34421 (Rb). Rio de Janeiro: Bowie & Cunningham s.n. [Sept. 5, 1815] (N); A. Lutz 816 (Hk). Santa Catarina: Mattos s.n. [23-10-52; R-20, no. 3] (Sm); Reitz 5903 (Sm); J. A. Rohr 484 (S). São Paulo: Brade 5767 (Sp-6711); Campos Novaes 267 (Sp-15631), s.n. [Campinas] (Sp-2085); Edwall 110 (Sp-15632); Gonçalves s.n. [Moinho Velho, Sept. 26, 1929] (Sp-26525); F. C. Hoehne s.n. [Butantan, Sept. 12, 1917] (Sp-518), s.n. [Parque do Estado, Oct. 5, 1931] (Sp-28316); Land 1964 (Sf); Löfgren s.n. [Herb. Comm. Geogr. & Geol. 211] (Sp-15629); Moldenke & Moldenke 19657 (Es, Lg, N); Pickel 2660 (Sf), 2832 (Sf); C. Smith 4 (Sp-32035); Swentorzecky s.n. [Guarulhos, Dec. 3, 1939] (Sp-41835); Venâncio 28 [A. Lutz 2017] (Z); A. P. Viégas 3972 (Be-36011). CULTIVATED: Brazil: W. Hoehne 2555 (Bh, It, N), 2556 (Bh, N); Moldenke & Moldenke 19604

(N), 19605 (N, Sm), 19623 (Es, Lg, N, Ot, Sm). New York: G. V. Nash s.n. [N. Y. Bot. Gard. Cult. Pl. 38331] (N).

PETREA RACEMOSA var. ALBA Kuhlmann, var. nov.

Synonymy: Petraea racemosa var. alba Kuhlmann ex Angely, Fl. Paran. 16: 68. 1960.

Literature: Kuhlmann, Flôres do Brasil 2: 30, in obs. 1955; Moldenke, Résumé 104, 221, & 464, nom. nud. 1959; Angely, Fl. Paran. 16: 68. 1960.

This variety is said by my good friend, Moyses Kuhlmann, in the reference cited above, to differ from the typical form of the species in having a white calyx and corolla. He says that it grows in the garden of his colleague, Dr. Suzana Miranda Pontes, presumably in São Paulo, Brazil, and apparently under cultivation. He says that it originated in Paraná. Since no Latin description has as yet been published as far as I am aware, I take pleasure in validating the name for him herewith: *A forma typica speciei calicibus corollisque albis recedit.*

PETREA RIPARIA Moldenke

Literature: Moldenke in Fedde, Repert. 43: 16, 194--195, 210, & 213. 1938; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 97. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89 & 192. 1949; Moldenke, Résumé 104 & 464. 1959.

This species has been collected in anthesis or fruit in February, August, and December, and the flowers are said to be rose-colored.

Additional citations: BRAZIL: Amapá: Frôes 25871 (N). Amazonas: Frôes 25053 (N); Herb. Inst. Nac. Pesq. Amaz. 6053 (2).

PETREA RIVULARIS Moldenke

Literature: Moldenke in Fedde, Repert. 43: 16, 191--192, 210, & 211. 1938; Moldenke, Geogr. Distrib. Avicenn. 21. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 97. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 66 & 192. 1949; Moldenke, Résumé 76 & 464. 1959.

PETREA RUGOSA H.B.K., Nov. Gen. & Sp. Pl. 2: 282 [as "Petraea"].

1818; Steud., Nom. Bot., ed. 1, 606 [as "Humb. & Bonpl."].

1821; Jacks., Ind. Kew. 2: 478. 1894.

Additional synonymy: Petrea rugosa Humb. ex Spreng., Syst. Veg. 2: 761. 1825. Petrea rugosa Kunth ex Schau. in A. DC., Prodr. 11: 619. 1847. Petraea rugosa Humb. & Bonpl. ex Moldenke, Alph. List Invalid Names Suppl. 1: 18, in syn. 1947. Petraea rugosa Kunth ex Moldenke, Alph. List Invalid Names Suppl. 1: 18, in syn. 1947.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 282. 1818; Steud., Nom. Bot., ed. 1, 606. 1821; Spreng., Syst. Veg. 2: 761. 1825; Steud., Nom. Bot., ed. 2, 2: 309. 1841; Walp., Repert. 4: 70.

1845; Benth., Pl. Hartw. 246. 1846; Schau. in A. DC., Prodr. 11: 619. 1847; Benth., Pl. Hartw. 358. 1857; Jacks., Ind. Kew. 2: 478. 1894; Moldenke in Fedde, Repert. 43: 14, 46--48, 210, 211, & 218. 1938; Moldenke, Geogr. Distrib. Avicenn. 19, 20, 22, & 39. 1939; Moldenke, Alph. List Common Names 8 & 20. 1939; Moldenke, Prelim. Alph. List Invalid Names 34 & 35. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, 34, 74, & 97. 1942; Moldenke, Alph. List Invalid Names 34 & 35. 1942; Moldenke, Phytologia 2: 108 (1944) & 183. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; Hodge, Revist. Fac. Nat. Agron. 7: 313. 1947; Moldenke, Phytologia 2: 500. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 64, 70, 162, & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 68, 73, 221, 331, 332, 415, & 464. 1959.

For some reason unknown to me, all except one of the various collections cited by me in my monograph (1938) were omitted from the alphabetized list of collections at its close. An additional common name is "chararilla", probably a misprint for "chaparilla".

Fosberg states that the calyx of this species is bright lavender-purple and that the plant was found by him on a brushy river bluff with seeps of water, generally rather dry, at an altitude of 850 meters.

Additional citations: COLOMBIA: Antioquia: Caffaorras s.n. [Aug. 1946] (Fn-2784). Huila: Fosberg 19234 (N).

PETREA SCABERRIMA Moldenke

Literature: Moldenke in Fedde, Repert. 43: 14, 177--179, 210, 212, 218, & 220. 1938; Moldenke, Geogr. Distrib. Avicenn. 19. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31 & 97. 1942; Moldenke, Phytologia 2: 183. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61 & 192. 1949; Moldenke, Résumé 68 & 464. 1959.

PETREA SWALLENI Moldenke

Literature: Moldenke in Fedde, Repert. 43: 16, 192--194, 210, & 220. 1938; Moldenke, Geogr. Distrib. Avicenn. 26. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 97. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 85. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 89 & 192. 1949; Moldenke, Résumé 104 & 464. 1959.

The fragment of Swallen 3127 cited by me in my monograph, page 194 (1938), as deposited in the Britton Herbarium at New York (N), has been transferred since to the herbarium of Cornell University (It) at Ithaca.

PETREA VOLUBILIS L.

Additional and corrected synonymy: ?Petroea volubilis Hort. apud Neumann, Ann. Fl. Pom. 1837-1838: 254--255, pl. 32. 1838. Petrea mexicana Humb. & Bonpl. apud Steud., Nom. Bot., ed. 2, 2: 309. 1841. Petrea mexicana Willd. apud Steud., Nom. Bot.,

ed. 2, 2: 309, in syn. 1841. Petrea stapeliae Paxt. apud Steud., Nom. Bot., ed. 2, 2: 309. 1841. Petrea volubilis var.? mexicana Schlecht. apud Steud., Nom. Bot., ed. 2, 2: 309, in syn. 1841. Petrea ovata Mart. & Gal. apud Schau. in A. DC., Prodr. 11: 619, in syn. 1847. Petrea volubilis Gaertn. apud Schau. in A. DC., Prodr. 11: 618, in syn. 1847. Petraea volobulis L. apud Norton, Brazil. Fl. pl. 49. 1893. Petrea suberrata Bárcena apud Jacks., Ind. Kew. 2: 478. 1894. Petraea volubilis L. apud H. J. Lam, Verbenac. Malay. Arch. 26. 1919. Petraea stapelsiae Paxt. apud Britton & P. Wils., Scient. Surv. Porto Rico 6: 370. 1926. Petraea volubulis L. apud Britton & P. Wils., Scient. Surv. Porto Rico 6: 640, sphalm. 1930. Pehoia volubilis Jacq. ex Moldenke in Fedde, Repert. 43: 32, in syn. 1938. Petraea mexicana Schlecht. apud Moldenke in Fedde, Repert. 43: 33, in syn. 1938. Petraea staphylea Hort. ex Moldenke in Fedde, Repert. 43: 33, in syn. 1938. Petrea stapelsiae Paxt. ex Moldenke in Fedde, Repert. 43: 33, in syn. 1938. Petria volubilis L. ex Moldenke in Fedde, Repert. 43: 32, in syn. 1938. Petraea volubilis Willd. ex Moldenke, Prelim. Alph. List Invalid Names 34, in syn. 1940. Petrea volubilis Cham. ex Moldenke, Prelim. Alph. List Invalid Names 35, in syn. 1940. Petraeae volubilis L. apud Augusto, Fl. Rio Grande do Sul 227, sphalm. 1946. Petraea volubilis Jack apud Daniel, Verb. Cent. Antioq. 5. 1947. Petrea volubilis H.B.K. ex Moldenke, Alph. List Invalid Names Suppl. 1: 18, in syn. 1947. Petrea voluvis Bravo Hollis, Bol. Soc. Bot. Mex. 18: 20, sphalm. 1955.

Additional and corrected literature: L., Sp. Pl., ed. 1, 626. 1753; Houst., Reliq. 5: pl. 11. 1781; Gaertn., Fruct. & Sem. Pl. 2: 471, pl. 177, fig. 5. 1791; Lam., Tabl. Encycl. Méth. 3: pl. 539. 1797; Sims in Curtis, Bot. Mag. 17: pl. 628. 1803; Joh. Kerner, Hort. Sempervir. pl. 151. 1805; Mirbel, Hist. Nat. Pl. 15: pl. 104. 1805; J. E. Sm. in Rees, Cycl. 27, no. 2. 1814; Linnaea 6: 373. 1817; Steud., Nom. Bot., ed. 1, 606. 1821; Cham., Linnaea 7: 367--370. 1832; Neumann, Ann. Fl. Pom. 1837-1838: 254--255, pl. 32. 1838; Paxt., Mag. Bot. 4: 199--200. 1838; Steud., Nom. Bot., ed. 2, 2: 309. 1841; Mart. & Gal., Bull. Acad. Brux. 11 (2): 328--329. 1844; Schau. in A. DC., Prodr. 11: 618--619. 1847; Schau. in Mart., Fl. Bras. 9: 273--274. 1851; Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 256. 1857; Héring, Hort. Franç. 1858: pl. 6. 1858; Ettingsh., Blatt-Skel. Dikot. 79, pl. 28, fig. 3. 1861; Bárcena, Notic. Cient. Estad. Hídalgo. 31--32. 1877; Garden 12: 40. 1877; Lowis, Familiar Ind. Fl. pl. 6. 1878; Wittm., Garten-Zeit. Berlin 3: 277. 1884; Forbes, Wand. Nat. East. Arch. 2: 78--79, 225, & 514. 1885; Norton, Brazil. Fl. pl. 49. 1893; Jacks., Ind. Kew. 2: 478. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 158. 1894; Millsp., Field Columb. Mus. Publ. Bot. 1: 42. 1895; E. D. Merr., Bur. Govt. Lab. Philip. Bull. 6: 36. 1904; Gard. Chron. 45: 252. 1909; Trop. Agric. 33, no. 1, frontispiece. 1909; Velenovsky, Vergl. Morphol.

Pfl. 3: 923 & 1194, pl. 9, fig. 25. 1910; Queensland Agric. Journ. 27: pl. 24. 1911; Koord., Exkursionsfl. Java 3: 133. 1912; Bryan, Nat. Hist. Hawaii pl. 68, fig. 1. 1915; H. Hall., Meded. Rijks Herb. Leid. 37: 22. 1918; H. J. Lam, Verbenac. Malay. Arch. 26—27 & addenda. 1919; H. F. Macmillan, Handb. Trop. Gard. & Plant., ed. 1, 290. 1920; Standl., Contrib. U. S. Nat. Herb. 23: 1237. 1924; H. F. Macmillan, Handb. Trop. Gard. & Plant., ed. 3, 126 & 128. 1925; Britton & P. Wils., Scient. Surv. Porto Rico 6: 370 (1926) and 640. 1930; Standl., Field Mus. Publ. Bot. 3: 403. 1930; Stapf, Ind. Lond. 5: 39. 1931; Grey & Hubbard, List Fl. Bot. Gard. Atkins Inst. 157. 1933; Crevost & Pételot, Bull. Econom. Indochine 37: 1288—1289. 1934; Junell, Symb. Bot. Upsal. 4: 43 & 45, fig. 80—86. 1934; Potbury, Carnegie Inst. Wash. Publ. 465: 35, 36, & 79. 1935; Lundell, Veg. Petén 75, 146, & 183. 1937; Moldenke in Fedde, Repert. 43: 13, 15, 32—44, & 209—221. 1938; Moldenke, Geogr. Distrib. Avicenn. 5, 6, 8, 14—18, 33, 34, & 39. 1939; Moldenke, Carnegie Inst. Wash. Publ. 522: 188—189. 1940; Moldenke in Pulle, Fl. Surin. 4 (2): 290. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20—27, 29, 62, 64, 65, 74, & 97. 1942; Darlington & Janaki Ammal, Chromosome Atlas 271. 1945; E. D. Merr., Plant Life Pacific World 161, 170, & 274. 1945; Moldenke, Phytologia 2: 183—184 & 196—198. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 18. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Falcão, Guia Visitant. Jard. Bot. Rio Jan. 20. 1947; Daniel, Verb. Cent. Antioq. 5. 1947; Moldenke, Phytologia 2: 500—501. 1948; H. S. Gentry, Allan Hancock Atlantic Exped. Rep. 6: 33. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35—39, 41, 44, 47, 49, 54, 142, 144, 145, 147, 162, & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; W. L. Phillips, Cat. Pl. Fairchild Trop. Gard. 33. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; F. Miranda, Veget. Chiapas 1: 255—256 (1952) & 372. 1953; Menninger, 1953 Cat. Flow. Trop. Trees 59. 1953; Roig, Dicc. Bot. 1: 764 and 2: 1077. 1953; Lombardo, Invent. Pl. Cult. Montevid. 176. 1954; Menninger, 1954 Price List [11] & 1955 Price List n.p. 1954; Bravo Hollis, Bol. Soc. Bot. Mex. 18: 20. 1955; Bravo Hollis, Anal. Inst. Biol. Mex. 26 (2): 295. 1955; Menninger, 1956 Price List [7] (1955) and 1957 Price List [9]. 1957; Alain in León & Alain, Fl. Cub. 4: 297, 298, & 544, fig. 128. 1957; Santapau, Fl. Purandhar 104. 1957; Menninger, 1958 Price List [7] (1958) & 1959 Price List [6]. 1958; Moldenke, Résumé 37, 42—45, 47, 48, 52, 55, 58, 62, 163, 170, 184, 187, 188, 190, 192, 197, 221, 329—333, & 464. 1959; Reitz, Sellowia 11: 76 & 121. 1959; Menninger, 1960 Price List Flow. Trees [10]. 1960.

Additional and corrected illustrations: Gaertn., Fruct. & Sem. Pl. 2: pl. 177, fig. 5. 1791; Lam., Tabl. Encycl. Méth. 3: pl. 539. 1797; Joh. Kerner, Hort. Sempervir. pl. 151. 1805; Neumann, Ann. Fl. Pom. 1837—1838: pl. 32 [in color]. 1838; Paxt., Mag. Bot. 4: 199 [in color]. 1838; Hérincq, Hortie. Franç. 1858: pl. 6. 1858; Lowis, Familiar Ind. Fl. pl. 6 [in color]. 1878; Wittm., Garten-Zeit. Berlin 3: 277. 1884; Norton, Brazil. Fl. pl. 49. 1893; Gard. Chron. 45: 252. 1909; Trop. Agric. 33, no. 1, front-

ispiece. 1909; Velenovsky, Vergl. Morphol. Pfl. 3: pl. 9, fig. 25. 1910; Queensland Agric. Journ. 27: pl. 24. 1911; Bryan, Nat. Hist. Hawaii pl. 68, fig. 1. 1915; H. F. Macmillan, Handb. Trop. Gard. & Plant., ed. 1, 290 (1920) and ed. 3, 126 & 128. 1925; Crevost & Pételot, Bull. Econom. Indo-chine 37: 1288. 1934; Alain in León & Alain, Fl. Cub. 4: fig. 128. 1957.

Additional common names recorded for this species are "bejuco del caballo", "bông xanh", "capital lila", "capitan lila", "capitán lila", "ci contre", "cipó azul", "coamecate azul", "flor de Sta. Rita", "hoa tía", "hoja chigue", "rampelas", "raspa sombrero", "sandpaper-vine", "tortilla tostada del caballo", "touca de viúva", and "viuvinha". Menninger says that the name "queen's wreath" is applied by florists in Florida to Antigonon leptopus Hook. & Arn. of the Polygonaceae. He describes our plant as a "magnificent woody evergreen vine from Brazil, flowering four times a year, with clusters of violet-like flowers of two shades of blue, in hanging clusters". He offers 2--5-foot plants at \$1.50 per foot. Phillips, in the reference cited above, says that the species is from "Cuba, Brazil". Grisebach, in the reference also cited above (1857), records the species from Guadeloupe, but I have seen only P. kohautiana Presl from that island. The Petreaa volubilis Jacq. and Petrea volubilis Jacq. referred to by me in my monograph, page 32 (1938), actually are P. kohautiana. The P. subserrata referred to and illustrated by Crevost & Pételot in the reference cited above (1934), with P. kohautiana, P. retusa, P. serrata, and P. volubilis given as synonyms, is actually P. volubilis L.

Daniel, in the reference cited above, states that Dr. Enrique Pérez Arbeláez records the names "chaparro" and "azulito" and says "es un lindo bejuco cultivado par sus ramitas violáceas, sus brácteas aterciopeladas en ternas." Steyermark states that the "bracts" [=calyx?] are pale-purple and the corolla darker purple. Matuda reports that the species is often cultivated in Mexico. It is also said to be cultivated in many gardens in the eastern and central portions of Madagascar. Khid Suvarnasuddhi, in a letter to me dated July 14, 1953, asserts that it is only found in cultivation in Thailand, never in the wild state. Santapau reports it to be cultivated in Bombay. The Marquand collection and Herb. Hort. Bot. Bogor. 22038, cited below, do not actually have any definite indication on their labels that they originated from cultivated material, but I assume that they did.

In the Glass Flower Exhibit at Harvard University model 639 is Petrea volubilis and shows longitudinal and transverse sections of the ovary, stamen, pistil, and an opened corolla

Wilson describes our plant as a "liana common in virgin forest, 900 feet altitude" in Guatemala. In Mexico it has been found on hills, in limestone roadcuts, and in loam on limestone among trees, at 1200 feet altitude, flowering in March, April, and June. Pringle 5003 was misidentified and widely distributed as "Petreaa arborea H.B.K."

Martin reports that P. volubilis may have a stem with a diameter of 15 cm. at breast height and blue flowers in February. Hurd describes it as a vine climbing on orange trees, growing "very high in some places", with purplish flowers in April; Smith found it to grow 15 feet tall, while Wonderly describes it as a woody vine with purplish-blue flowers, growing on shady rocky slopes.

Additional citations: MEXICO: Campeche: C. D. Mell s.n. [near Campeche, Feb. 1945] (Du—350273). Chiapas: Wonderly 32 (Mi). San Luis Potosí: L. I. Davis s.n. [south of Valles, April 13, 1946] (Au—172014); Edw. Palmer 1064 (Pa); Pringle 5003 (Gg—421281, N, St). Tamaulipas: Crutchfield & Johnston 5201 (Au—178562); L. I. Davis s.n. [Nuevo Morelos, April 9, 1946] (Au—172013); R. P. Hurd 72 (Mi); P. S. Martin 31 (Mi); Smith & Barkley 174174 (Au—169719). Vera Cruz: C. L. Smith 1017 (Mi, N, TL). GUATEMALA: Zacapa: Steyermark 42149 (N). PANAMA: Barro Colorado Island, Canal Zone: Shattuck 412 (Cz); Silvestre Avilas 14 (Cz). CUBA: Havana: León s.n. (Vi—4190). INDIA: Madras: Kuriakose s.n. [25.2.33] (N); Saulière 188 (Bz—22036). CHINA: Kwangtung: Dahlström 361 (S). RIOUW ARCHIPELAGO: Bintan: Bttnemeijer 6487 (Bz—22035). SUMATRA: Jacobson 28 (Bz—22034). JAVA: Bakhuizen van den Brink Jr. 2700 (Ut—24909a); Brinkman 52 (Bz—22028); Forbes 403 (Bz—22032, Bz—22033); Laeuwen 445 (Bz—22027); Lörzing 653 (Bz—22026). CULTIVATED: Argentina: Ruiz Leal 14200 (Ss). Belgian Congo: Vanderyst 35014 (Br). Belgium: M. Martens s.n. [h. b. Brux. 1851] (Br). Cameroons: Winkler 611 (B). Cuba: Acuffa s.n. [Herb. Estac. Exp. Agron. 11516] (Es); Ekman 13050 (N); Killip 45530 (Sm); Moldenke & Moldenke 19887 (Es, Lg, N), 20600 (N). Dominican Republic: H. A. Allard 13175 (S). Florida: H. N. Moldenke 21476 (Hk). Hawaiian Islands: E. C. Marquand s.n. [February 28, 1938] (N); L. W. Shattuck s.n. (Dt). India: Herb. Hort. Bot. Bogor. 22038 (Bz); Herb. Hort. Bot. Calcuttensis s.n. (Bz—22037). Isla de Pinos: Killip 43554 (Z). Java: Backer 33189 (Bz—22030, Bz—22031), 33190 (Bz—22029); Bakhuizen van den Brink 2721 (Bz—22021); Herb. Hort. Bot. Bogor. X.F.2 (Bz—22024, Bz—22025, Bz—25598, Bz—25599), X.F.3 (Bz—22022, Bz—22023), XV.E.72 (Bz, Bz, Bz, N), XV.E.72a (Bz—26281, Bz, Bz), XV.E.73 (Bz—26282, Bz—26283, N), XV.E.73a (Bz—26552), XV.E.74 (Bz—26284, Bz, Bz, N), XV.E.74a (Bz), XV.E.75 (Bz—26285, Bz—26286, N). Madagascar: Herb. Jard. Bot. Tananarive 882 (P). Massachusetts: R. E. Torrey s.n. [Amherst, Mar. 3, 1939] (Ms). Mexico: Moldenke & Moldenke 19825 (N). Sarawak: Clemens & Clemens 20584 [field no. 6597] (N).

PETREA VOLUBILIS var. ALBIFLORA (Standl.) Moldenke

Additional and corrected literature: Standl., Field Mus. Publ. Bot. 11: 140. 1932; Moldenke in Fedde, Repert. 43: 15, 44—45, 209, & 219. 1938; Moldenke, Geogr. Distrib. Avicenn. 15. 1939;

Moldenke, Carnegie Inst. Wash. Publ. 522: 189--190. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 21 & 97. 1942; Moldenke, Phytologia 2: 198. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 36 & 192. 1949; Moldenke, Résumé 43, 221, 332, 333, & 464. 1959.

Additional citations: CULTIVATED: St. Vincent: Morton 5435 (W--1884345).

PETREA VOLUBILIS var. PUBESCENS Moldenke

Additional synonymy: Petrea consanguinea Klotzsch apud E. J. Salisb., Ind. Kew. Suppl. 10: 168, in syn. 1947.

Literature: Cham., Linnaea 7: 367. 1832; Mart. & Gal., Bull. Acad. Brux. 11 (2): 329. 1844; Moldenke in Fedde, Repert. 43: 15, 45--46, 209--216, & 218--220. 1938; Moldenke, Alph. List Common Names 8, 10, 12, & 26. 1939; Moldenke, Geogr. Distrib. Avicenn. 14--18 & 39. 1939; Moldenke, Prelim. Alph. List Invalid Names 34 & 36. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20--24, 74, & 97. 1942; Moldenke, Alph. List Invalid Names 34 & 35. 1942; Moldenke, Phytologia 2: 108 (1945) & 198. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 168. 1947; Moldenke, Phytologia 2: 501. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 37--39, 41, 162, & 192. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 37, 42, 44, 45, 47, 48, 221, 331, 332, & 464. 1959.

An additional vernacular name recorded for this variety is "jasmin o'coamecate azul". It has been collected at 550--950 m. altitude in Alajuela, flowering in February and August, fruiting in March, growing as a vine on fence rocks.

Additional citations: MEXICO: Vera Cruz: Linden 18, in part (Br). HONDURAS: Morazán: Williams & Molina R. 11943 (Mi). COSTA RICA: Alajuela: Brenes 20468 [3] (N), 21462 [3] (N); J. León 1746 [Herb. Inst. Interam. Turrialba 932] (W--2021496).

PETREA VOLUBILIS L.

Additional citations: GUATEMALA: Alta Verapaz: C. L. Wilson 334 (Dt). El Petén: H. H. Bartlett 12559 (Du--353946).

ADDITIONAL NOTES ON THE GENUS AEGIPHILA. XIV

Harold N. Moldenke

In addition to the abbreviations for the names of herbaria listed by me in Phytologia 5: 154--159 (1955) and 6: 242 (1958), the following are also being employed in this series of notes: Bd = Herbarijm Bradeanum, Rio de Janeiro, Brazil; Bs = Basler Botanische Gesellschaft, Basel, Switzerland; Gl = Museu Goeldi, Belém, Pará, Brazil; Gp = Ontario Agricultural College, Guelph,

Ontario, Canada; Mm = McGill University, Montreal, Quebec, Canada; Ng = Department of Forests, Lae, New Guinea; Um = University of Montreal Herbarium, Montreal, Quebec, Canada; Wp = University of Manitoba, Winnipeg, Manitoba, Canada.

AEGIPHILA Jacq.

Literature: Hughes, Nat. Hist. Barbado. 156. 1750; P. Browne, Civil & Nat. Hist. Jamaica. 140. 1756; Jacq., Enum. Syst. Pl. 12. 1760; Jacq., Obs. Bot. 2: 3, pl. 27. 1764; L., Mant. 144 & 198. 1767; L., Pflanzensyst. 3: 124--125. 1773; L., Syst. Veg. 134. 1774; Aubl., Hist. Pl. Guian. Franç. 1: 61--68. 1775; Reichard in L., Gen. Pl., [ed. 8], 1: 61. 1778; L., Syst. Pl. 334. 1779; Jacq., Select. Stirp. Amer. Hist. Pict. 13, pl. 259, fig. 6. 1780; L., Gen. Pl., ed. 13, 7. 1780; Lam., Encycl. Méth. Bot. 1: 46. 1783; Jacq., Ind. Plant., ed. 14, 32. 1785; Sw., Prodr. 31--32. 1788; Jacq., Select. Stirp. Amer. 226. 1788; J. F. Gmel. in L., Syst. Nat. 2: 259. 1789; Schreb. in L., Gen. Pl., ed. 8 [9], 1: 73. 1789; Vitman, Summa Pl. 1: 173. 1789; Lam., Illustr. Gen. nos. 1503--1505, pl. 70 & 71, fig. 1--3. 1791; J. F. Gmel. in L., Syst. Nat., ed. 13, 2: 259. 1791; Haenke in L., Gen. Pl., ed. 8 [10], 1: 105. 1791; Lam., Tabl. Encycl. Méth. Bot. 1: 293--294. 1792; L. C. Rich., Act. Soc. Hist. Nat. Paris 106. 1792; Vent., Tabl. Rég. Vég. 2: 318. 1794; Vahl, Eclog. Amer. 1: 14--16. 1796; R. A. Salisb., Prodr. 67. 1796; J. F. Gmel. in L., Syst. Nat., ed. 13 [rev.], 2: 259. 1796; Sw., Fl. Ind. Occ. 1: 254--260. 1797; Willd., Sp. Pl. 1: 615--617. 1797; Raeusch., Nom. Bot. 37. 1797; Ruiz & Pav., Fl. Peruv. & Chil. 1: 49--50. 1798; J. F. Gmel. [Turton], Gen. Syst. Nat. 5: 218--219. 1802; Desf., Tabl. Écol. Bot. 53. 1804; Pers., Syn. Pl. 1: 132. 1805; A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 74 & 76. 1806; Hedw., Gen. Pl. no. 368. 1806; Andr., Bot. Repos. 9: 578. 1809; Jacq., Frag. Bot. 40--41, pl. 46, fig. 1. 1809; Poir. in Lam., Encycl. Méth. Suppl. 1: 150--151 (1810) and 2: 33. 1811; R. Br. in Ait., Hort. Kew., ed. 2, 4: 64. 1814; Morel, Tabl. Écol. Bot. Jard. Pl. Paris, ed. 2, 64 & 250. 1815; H.B.K., Nov. Gen. & Sp. Pl. 2: 248--251. 1817; Pers., Sp. Pl. 1: 339. 1817; H.B.K., Nov. Gen. & Sp. Pl. 3: 65--66. 1818; Lodd., Bot. Cab. 2: pl. 132. 1818; Roem. & Schult., Syst. Veg., ed. 1, 3: 95--96 & 100--103 (1818), 4: 698 (1819), ed. 2, 1: 97 (1820), and 2: 82. 1820; Willd., Nom. Bot., ed. 2 [Donnersmarck], 82. 1821; Steud., Nom. Bot., ed. 1, 1: 16. 1821; Kunth, Syn. Pl. 2: 42--44. 1823; Spreng. in L., Syst. Veg., ed. 16, 1: 29 & 648. 1825; Vell., Fl. Flum. 37--38. 1825; Hoffmsgg., Verz. Pflanzenkult. Graf. Hoffmsgg. Gart. Nachtr. 3: 7, 18, & 74. 1826; Lindl., Bot. Reg. 11: pl. 946. 1826; Roem. & Schult., Mant. 3: 10. 1827; Vell., Fl. Flum. Icon. 1: pl. 88--95. 1827; Desf., Cat. Pl. Hort. Reg. Paris., ed. 3, 391. 1829; Maycock, Fl. Barbado. 70--72. 1830; Spreng. in L., Gen. Pl., ed. 9 [11], 1: 80--81 & 815. 1830; Schlecht. & Cham., Linnaea 6: 371. 1831; Abhand. Akad. Berol. 215. 1831; Cham., Linnaea 7: 109--115. 1832; Kostel., Allgem. Mediz.-pharm. Fl. 3: 829--830. 1834; Richter, Cod. Bot. Linn., ed. 1, 130. 1835; Endl., Gen. Pl. 637--638. 1838; Benth., Ann. Nat. Hist. 2: 449. 1839; Dietr., Syn. Pl. 1: 429--430. 1839;

Steud., Nom. Bot., ed. 2, 1: 29. 1840; Meisn., Pl. Vasc. Gen. 2: 200. 1840; Richter, Cod. Bot. Linn., ed. 2, 130. 1840; Paxt., Pocket Bot. Dict. 8. 1840; Peterm., Cod. Bot. Linn. Ind. Alph. 33. 1840; Casar., Nov. Stirp. Bras. Dec. 47. 1842; G. Gardn. in Hook., Lond. Journ. Bot. 1: 184. 1842; Meisn., Pl. Vasc. Gen. 1: 292. 1842; Benth., Bot. Voy. Sulph. 154. 1844; G. Gardn. in Hook., Lond. Journ. Bot. 4: 134. 1845; Walp., Repert. Bot. Syst. 4: 118-124. 1845; A. DC., Prodr. 9: 512-513. 1845; Seem., Bot. Voy. Herald 189. 1845-1851; Jacques & Hérincq, Man. Gén. 503-505. 1845-1862; Hook. in Curtis, Bot. Mag. 72 [ser. 3, 2]: pl. 4230. 1846; Paxt., Mag. Bot. 13: 115, 217, 218, & 275. 1847; Schau. in A. DC., Prodr. 11: 647-655. 1847; Klotzsch & Karst., Ausw. Neu. Gew. Venez. 31-33. 1848; Rich. Schomb., Versuch Fauna Fl. Brit.-Guian. 959 & 1150. 1848; Lem. & Van Houtte, Fl. Serres, ser. 1, 4: pl. 324. 1848; Walp., Anal. Bot. Syst. 1: 544. 1848; Paxt., Pocket Bot. Dict., new ed., 8. 1849; A. Rich. in Sagra, Hist. Fis. Cuba 11: 145-146. 1850; Schau. in Mart., Fl. Bras. 9: 278-290. 1851; Wittstein, Etymol.-bot. Handwörterb. 19 & 37. 1852; Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 256-257. 1857; Walp., Annal. Bot. Syst. 5: 710. 1860; Griseb., Fl. Brit. West Ind. 499-500. 1861; Bocq., Adansonia 3: 187-190. 1862; Bocq., Revue Groupe Verb. 3 & 188-190, pl. 9 & 10. 1862; Rosenthal, Syn. Pl. Diaph. 430 & 1130. 1862; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 218-220. 1863; Griseb., Cat. Pl. Cub. 216. 1866; Pritzel, Icon. Bot. Ind. 1: 23. 1866; Hereman, Paxt. Bot. Dict. 13. 1868; Sauv., Fl. Cub. 113. 1868; Pritzel, Thes. Lit. Bot., ed. 2. 1872; Benth. in Benth. & Hook., Gen. Pl. 2: 1151. 1876; Hiern in Warming, Vidensk. Meddel. 23: 711-713. 1877; Eggers, Fl. St. Croix 84. 1879; Hemsl., Biol. Cent.-Am. Bot. 2: 538. 1882; Stehl, Estud. Fl. Puerto-Rico 6: 222-223. 1888; Alfaro, Anal. Mus. Nac. Rep. Costa Rica 1 (2): 60. 1888; K. Schum. in Mart., Fl. Bras. 6: 217. 1889; Kuntze, Rev. Gen. Pl. 2: 505. 1891; J. D. Sm., Enum. Pl. Guat. 2: 60. 1891; Baill., Hist. Pl. 11: 87 & 119, fig. 101 & 102. 1891; Warming, Lagoa Santa 373 & 434. 1892; J. D. Sm., Bot. Gaz. 18: 7. 1893; J. D. Sm., Enum. Pl. Guat. 3: 65 & 110. 1893; Jacks., Ind. Kew. 1: 46-47. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 143 & 165-166. 1894; J. D. Sm., Enum. Pl. Guat. 4: 123. 1895; Briq., Rev. Monog. Verb. 143 & 165-166. 1895; Rusby, Mem. Torrey Bot. Club 4 (3): 245. 1895; Durand & Jacks., Ind. Kew. Suppl. 1: 12. 1896; Rusby, Mem. Torrey Bot. Club 6 (1): 107. 1896; Duss, Ann. Inst. Colon. Marseil. 3: 466-467. 1896; Duss, Fl. Phanerog. Antill. Franç. 466-467. 1896; J. D. Sm., Bot. Gaz. 25: 157. 1898; Greerm., Proc. Amer. Acad. 33: 485. 1898; Pittier, Primit. Fl. Costaric. 2: 210-212. 1898; Arech., Anal. Mus. Montev. 2: 280. 1899; Dalla Torre & Harms, Gen. Siphonog. 432. 1900; Rusby, Bull. Torrey Bot. Club 27: 81. 1900; Chod., Plant. Hassler. 1: 200. 1902; Urb., Symb. Antil. 3: 364-367. 1903; Arech., Anal. Mus. Nac. Montev. 4: 62. 1903; J. D. Sm., Enum. Pl. Guat. 6: 34. 1903; Arech., Fl. Urug. 2: 108. 1903; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 4. 1904; Briq., Bull. Herb. Boiss., sér. 2, 4: 1166-1169. 1904; Briq. in Chod., Plant. Hassler. 2: 502-505. 1904; Pulle, Enum. Vasc. Pl. Surin. 403.

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vist. Sudam. Bot. 5: 166, 167, & 170. 1938; Pittier, Gen. Pl. Venez. Clav. Anal. 243. 1939; Moldenke, Geogr. Distrib. Avicenn. 1, 4, 6--25, 27--29, & 35. 1939; Moldenke, Alph. List Common Names 1, 4--10, 12--15, 18--21, 23, 27--31, 33, & 34. 1939; Moldenke, Lilloa 4: 286 & 315--322. 1939; Moldenke, Phytologia 1: 364--368. 1939; Herter, Beih. Bot. Centralbl. 59: 275. 1939; Pittier, Supl. Pl. Usual. Venez. 54. 1939; Bot. Jahresber. 59 (2): 416. 1939; Moldenke, Phytologia Offers Prompt Publ. Serv. 2. 1940; Yuncker, Field Mus. Publ. Bot. 9 (4): 329. 1940; Moldenke, Revist. Sudam. Bot. 6: 176. 1940; Moldenke, Prelim. Alph. List Invalid Names 1--5, 8, 10, 11, 15, 18, 19, 21--25, 29, 32, 33, 39, & 42. 1940; Moldenke in Pulle, Fl. Surin. 4 (2): 260 & 296--304. 1940; Moldenke in Lundell, Carnegie Inst. Wash. Publ. 522: 149 & 200--203. 1940; Moldenke, Suppl. List Invalid Names 1, 3, & 11. 1941; Moldenke, Phytologia 2: 57--64. 1941; Moldenke, Alph. List Invalid Names 1--4, 7--9, 13, 16, 19, 21--24, 27, 33, 34, 39, 43, & 53. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 19--36, 39--42, 46, 70, 84, & 85. 1942; Sampaio & Peckolt, Arquiv. Mus. Nac. Rio 37: 334. 1943; Moldenke, Phytologia 2: 90. 1944; Moldenke, Alph. List Cit. 1: 2, 3, 5--7, 9--12, 15, 16, 21, 24, 25, 27--30, 32--34, 36, 37, 39, 40, 42--45, 48, 50, 51, 54, 56--65, 67, 68, 70, 74, 76--82, 88--90, 92--94, 96, 98--100, 102, 104, 106, 107, 109, 112--114, 116, 117, 121--123, 127, 130--137, 139, 141, 142, 145, 155--157, 160--164, 167--173, 177--181, 184--186, 188--190, 192, 193, 195, 197, 198, 200--202, 204, 205, 207, 208, 210--212, 215, 217, 218, 222--224, 226, 227, 230--232, 236--244, 246, 248--250, 252--255, 258, 259, 261--276, 281, 282, 284--287, 289, 290, 298, 300--306, 308--313, & 315--325. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Phytologia 2: 387--400. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 18, 20--24, 28, 32, 43, 44, 46, 49, 50, 52, 54, 56--58, 61--70, 73, 74, 79, 82--85, & 87. 1948; Moldenke, Phytologia 2: 437--450 (1948) and 3: 46--48. 1948; Moldenke, Alph. List Cit. 2: 327--337, 339--354, 359, 361--365, 367--370, 377, 389, 390, 392, 402, 403, 409--414, 416, 432--437, 439, 442, 444--446, 458, 459, 464, 469, 479, 482, 485--487, 489--491, 500--504, 521, 528--531, 533--536, 543, 545, 548--554, 557, 558, 560, 561, 564--569, 571--574, 576--582, 587, 588, 593, 598, 599, 601, 603, 604, 607, 609--612, 615, 616, 618--625, 628, 630--632, 636, 638, 640, 642, 643, 647, & 649--651 (1948), 3: 654, 655, 658, 659, 662--665, 667--671, 674--676, 684, 686, 687, 690, 692, 694--696, 701, 702, 704--707, 709--717, 720, 724--726, 728, 730, 731, 736, 737, 739, 740, 745, 747--751, 755--759, 761, 768, 770--772, 774, 779, 780, 782--784, 786, 800--803, 805, 806, 808--810, 813--827, 833--835, 837--840, 842, 844, 845, 846, 847, 853--858, 863, 865--867, 869--871, 877, 879--881, 884--895, 900--903, 905--907, 911, 915, 916, 918--929, 934--940, 944--951, 955--963, 965, 967--969, 971, 973--976, & 978 (1949), and 4: 981--986, 988, 994, 995, 999--1001, 1005--1009, 1013--1020, 1022--1055, 1058--1082, 1086, 1087, 1093, 1094, 1096--1098, 1100, 1103, 1105, 1106, 1109, 1111, 1113, 1114, 1117, 1120, 1123--1125, 1127, 1129--1139, 1141--1143, 1145--1147, 1151--1153, 1162, 1166, 1170, 1175, 1186, 1191--1193, 1198, 1209, 1214,

1215, 1221, 1222, 1227, 1230, 1232, 1236, 1243, 1247, 1248, 1251, 1254, 1283, 1290, 1293, 1294, 1296, 1301, & 1304. 1949; Kuhlmann & Kuhn, Fl. Dist. Ibiti 116. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 9, 28, 34, 36--42, 46, 47, 49--56, 58, 59, 62, 65, 67--71, 74, 75, 95, 96, 98, 99, 102, 156, 174, & 175. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Stellfeld, Trib. Farmac. 19 (10): 163--164. 1951; Miranda, Veget. Chiapas 260 & 328--329. 1953; Moldenke, Phytologia 4: 347--354, 384--385, & 427--428. 1953; Roig, Dicc. Bot. 2: 575--576 & 976. 1953; Biol. Abstr. 25: 4058 (1954) and 28: 3057 & 3532. 1954; Rambo, Sellowia 6: 59, 84, & 153. 1954; Moldenke, Mem. N. Y. Bot. Gard. 9: 175--176. 1955; Moldenke, Phytologia 5: 225. 1955; Mendes Magalhães, Bol. Soc. Portueg. Cienc. Nat., ser. 2, 5: 111. 1955; Goodspeed & Stork, Univ. Calif. Publ. Bot. 28 (3): 117 & 131. 1955; Biol. Abstr. 27: 3764. 1955; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 384 & 405--411. 1955; Moldenke, Fam. 2 Verbenac. 24--30. 1955; Hansford, Sydowia 9: 23. 1955; Cash, Biol. Abstr. 30: 3240. 1956; Revist. Sudam. Bot. 10: 258. 1956; Mendes Magalhães, Anais V Reun. Anual Soc. Bot. Bras. 256--257. 1956; Moldenke in Steyermark, Fieldiana 28: 512--513 & 1082. 1957; Alain in León & Alain, Fl. Cuba 4: 280 & 309--310, fig. 132. 1957; Steyermark, Fieldiana 28: 1178. 1957; Moldenke, Am. Midl. Nat. 59: 333. 1958; Biol. Abstr. 30: 3728 & 4394. 1958; Moldenke, Résumé 12, 33, 34, 40, 41, 43--47, 49, 50, 54, 56, 58--62, 64, 65, 69, 70, 74, 76--79, 81, 82, 85, 86, 112, 113, 115, 118, 122, 212, 227--232, 234, 239, 240, 242, 243, 254, 260, 261, 266, 272, 276, 278, 284, 302, 319, 321, 322, 329, 330, 341, 350, 383, 395--399, 408, 414, 415, 420, 422, 423, & 440--442. 1959; Moldenke, Résumé Suppl. 1: 4, 5, 15, & 24. 1959; Angely, Ind. Angely 9--10. 1959; Reitz, Sellowia 11: 66 & 84. 1959; Veloso & Klein, Sellowia 11 (10): 28, 50, 94, 95, & 105. 1959; Angely, Fl. Paran. 15: 12 & 24. 1960.

Hansford, in the reference cited above, describes a new fungus, Meliola pseudocapensis Hansf., from an undetermined species of Aegiphila based on an Ule collection from Brazil.

An additional excluded species is: Aegiphila bracteata Steud. ex Moldenke, Alph. List Cit. 2: 445, sphalm. 1948 = Petrea bracteata Steud.

AEGIPHILA ACULEIFERA Moldenke

Additional literature: Moldenke, Alph. List Common Names 29. 1939; Moldenke, Geogr. Distrib. Avicenn. 16 & 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 30, & 84. 1942; Moldenke, Alph. List Cit. 1: 58 & 321 (1946), 2: 328, 339, 343, 344, 346, & 642 (1948), 3: 819, 940, 945, 950, 965, 978 (1949), and 4: 1078. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 38, 58, & 174. 1949; Moldenke, Phytologia 4: 385 & 428. 1953; Moldenke, Résumé 46, 64, & 440. 1959.

Little reports this species as growing in the dwarf forest in Huila. Skutch describes it as a small tree with white flowers, at altitudes of 1500 to 1750 meters.

Additional citations: COSTA RICA: Alajuela: Brenes 5709 [301]

(N), 5709a (N); Skutch 3255 (W—1643369). COLOMBIA: Huila: E. L. Little Jr. 7711 (N, W—2140351).

AEGIPHILA ALBA Moldenke

Additional literature: Moldenke, Alph. List Common Names 19 & 31. 1939; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 84. 1942; Moldenke, Alph. List Cit. 1: 181. 1946; Holdridge & al., Forests West & Cent. Ecuad. 46. 1947; Moldenke, Alph. List Cit. 2: 352 (1948), 3: 667, 731, & 974 (1949), and 4: 1016, 1070, & 1079. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 174. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Phytologia 4: 385. 1953; Moldenke, Mem. N. Y. Bot. Gard. 9: 175. 1955; Moldenke, Résumé 78 & 440. 1959.

White states that the flowers are fragrant. He found the species in cutover areas, while Asplund found it in a pasture.

Additional citations: ECUADOR: Esmeraldas: Asplund 16369 (S). Los Ríos: S. S. White 5718 (T1).

AEGIPHILA AMAZONICA Moldenke

Literature: Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Phytologia 1: 378—380. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 84. 1942; Moldenke, Alph. List Cit. 1: 167, 168, & 274. 1946; Moldenke, Phytologia 2: 389. 1947; Moldenke, Alph. List Cit. 2: 444, 445, & 624 (1948) and 4: 1079. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 4: 347—348. 1953; Moldenke, Résumé 81, 85, & 440. 1959; Angely, Ind. Angely 9. 1959.

Luis reports that the stems of this species are quadrangular and the flowers aromatic. He found it growing in sandy "terra firma". It has been collected in anthesis in August. The Williams collection cited below was previously misidentified as A. integrifolia (Jacq.) Jacks.

Additional citations: PERU: Loreto: Ll. Williams 2052 (N).

BRAZIL: Amazonas: Luis s.n. [Herb. Inst. Nac. Pesq. Amaz. 1556] (Z).

AEGIPHILA ANOMALA Pittier

Literature: Pittier, Contrib. U. S. Nat. Herb. 12: 181, fig. 19. 1909; Moldenke, Brittonia 1: 288—289. 1934; Moldenke, Phytologia 1: 186—187 & 222. 1937; Standl., Field Mus. Publ. Bot. 18: 994. 1938; Moldenke, Alph. List Common Names 29. 1939; Moldenke, Geogr. Distrib. Avicenn. 16. 1939; Moldenke, Phytologia 1: 380. (1940) and 2: 58—59. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22 & 84. 1942; Moldenke, Phytologia 2: 90. 1944; Moldenke, Alph. List Cit. 1: 58, 321, & 325. 1946; Moldenke, Phytologia 2: 389. 1947; Moldenke, Alph. List Cit. 2: 340, 344—346, & 390 (1948), 3: 821, 944, 945, & 978 (1949), and 4: 1031 & 1186. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 38 & 174. 1949; Moldenke, Résumé 46 & 440. 1959.

Illustrations: Pittier, Contrib. U. S. Nat. Herb. 12: 181, fig. 19. 1909.

AEGIPHILA AUREA Turcz.

Literature: Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 218. 1863; Jacks., Ind. Kew. 1: 46. 1893; Moldenke, Brittonia 1: 468—469. 1934; Moldenke, Geogr. Distrib. Avicenn. 4: 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 24 & 84 (1942) and [ed. 2], 42 & 174. 1949; Moldenke, Alph. List Cit. 3: 663. 1949; Alain in León & Alain, Fl. Cuba 4: 310. 1957; Moldenke, Résumé 50 & 440. 1959; Moldenke, Résumé Suppl. 1: 4 & 15. 1959.

Examination of a phototype shows that this plant is Clerodendrum grandiflorum (Hook.) Schau. and should, therefore, be excluded from the genus Aegiphila.

AEGIPHILA AUSTRALIS Moldenke

Literature: Moldenke, Phytologia 1: 187—188 & 222 (1937) and 1: 290. 1938; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 84 (1942) and [ed. 2], 74 & 174. 1949; Moldenke, Alph. List Cit. 3: 783 (1949) and 4: 1014. 1949; Moldenke, Phytologia 4: 348. 1953; Angely, Ind. Ang. 9. 1959; Moldenke, Résumé 85 & 440. 1959.

AEGIPHILA BARBADENSIS Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 113. 1933; Moldenke, Brittonia 1: 376—377. 1934; Moldenke, Phytologia 1: 188. 1937; Moldenke, Geogr. Distrib. Avicenn. 11. 1939; Moldenke, Phytologia 1: 380 (1940) and 2: 59. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 29 & 84. 1942; Moldenke, Alph. List Cit. 1: 326 (1946) and 4: 1052 & 1105. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 55 & 174. 1949; Moldenke, Résumé 61 & 440. 1959.

AEGIPHILA BOGOTENSIS (Spreng.) Moldenke

Literature: H.B.K., Nov. Gen. & Sp. Pl. 3: 65—66, fig. 108. 1818; Spreng. in L., Syst. Veg., ed. 16, 1: 648. 1825; DC., Prodr. 9: 512. 1845; Bocq., Adansonia 3: 187—188. 1862; Jacks., Ind. Kew. 1: 106 (1893) and 2: 823. 1895; Moldenke, Brittonia 1: 283—284. 1934; Moldenke, Phytologia 1: 188 (1937) and 1: 290. 1938; Moldenke, Geogr. Distrib. Avicenn. 18 & 22. 1939; Moldenke, Prelim. Alph. List Invalid Names 1, 5, & 25. 1940; Moldenke, Phytologia 1: 380 (1940) and 2: 59. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 33, & 84. 1942; Moldenke, Alph. List Invalid Names 1, 4, & 24. 1942; Moldenke, Alph. List Cit. 1: 133, 135, 142, 145, 222, 243, 275, & 326. 1946; Moldenke, Phytologia 2: 389—390. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Alph. List Cit. 2: 347, 603, 609, 611, & 642 (1948), 3: 664, 731, 758, 759, 806, 833, 857, 901, 903, & 974 (1949), and 4: 999, 1005, 1006, 1069, 1077—1079, 1215, & 1222. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58, 62, 69, & 174. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Phytologia 4: 348. 1953; Moldenke, Résumé 64, 69, 78, 228, 234, 284, & 440. 1959.

Illustrations: H.B.K., Nov. Gen. & Sp. Pl. 3: fig. 108. 1818. Asplund describes this species as a tree 30 m. tall, with

pale yellowish-green flowers, growing in cleared forests.

Additional citations: COLOMBIA: Norte de Santander: Killip & Smith 19706 (Ew). VENEZUELA: Táchira: Aristeguieta 2568 (N). ECUADOR: Napo-Pastaza: Asplund 17204 (S).

AEGIPHILA BOGOTENSIS var. AEQUINOCTIALIS Moldenke

Literature: Moldenke, *Phytologia* 4: 173 & 348. 1953; Moldenke, *Mem. N. Y. Bot. Gard.* 9: 175. 1955; Moldenke, *Résumé* 78 & 440. 1959.

AEGIPHILA BOLIVIANA Moldenke

Literature: O. Thomas, *Proc. Zool. Soc.* 1893: 242. 1893; Bather, *Nat. Sci.* 4: 57. 1894; Swingle, *Science*, ser. 2, 37: 866—867. 1913; Moldenke in Fedde, *Repert. Sp. Nov.* 33: 114. 1933; Moldenke, *Brittonia* 1: 391 & 399—400. 1934; Moldenke, *Phytologia* 1: 188—189 & 208. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 27. 1939; Moldenke, *Phytologia* 1: 380—381 (1940) and 2: 59. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 39 & 84. 1942; Moldenke, *Alph. List Cit.* 1: 273, 319, & 326 (1946), 2: 444 & 501 (1948), and 3: 967 & 968. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 95 & 174. 1949; Moldenke, *Phytologia* 4: 348—349. 1953; Moldenke, *Résumé* 112, 228, & 440. 1959.

AEGIPHILA BRACHIATA Vell.

Additional literature: Moldenke, *Geogr. Distrib. Avicenn.* 24 & 28. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 1, 2, & 4. 1940; Moldenke, *Alph. List Invalid Names* 1—3. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35, 40, & 84. 1942; Sampaio & Peckolt, *Arquiv. Mus. Nac. Rio Jan.* 37: 334. 1943; Moldenke, *Alph. List Cit.* 1: 137, 227, & 238. 1946; Lombardo, *Fl. Arb. Arbores. Urug.* 185 & 201. 1947; Moldenke, *Alph. List Invalid Names Suppl.* 1: 1. 1947; Moldenke, *Alph. List Cit.* 2: 328, 333, 336, 368, 552, & 599 (1948), 3: 755, 756, 840, 915, & 920—923 (1949), and 4: 1032, 1058, 1066, 1087, & 1293. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74, 98, & 174. 1949; Moldenke, *Phytologia* 4: 385. 1953; Rambo, *Sellowia* 6: 59 & 84. 1954; Moldenke, *Résumé* 85, 115, 228, 229, 231, & 440. 1959; Angely, *Ind. Ang.* 10. 1959; Angely, *Fl. Paran.* 16: 36. 1960.

The species ascends to 900 meters altitude.

Additional citations: BRAZIL: Rio de Janeiro: Glaziou 14165 (B). Santa Catarina: Reitz & Klein 5185 (N, Z).

AEGIPHILA BRACTEOLOSA Moldenke

Literature: Rusby, *Mem. N. Y. Bot. Gard.* 7: 341. 1927; Moldenke, *Brittonia* 1: 456—458. 1934; Moldenke, *Phytologia* 1: 189—190 (1937) and 1: 290. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 20 & 24. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 1 & 4. 1940; Moldenke, *Phytologia* 1: 381 (1940) and 2: 59. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 32, 34, 35, & 84. 1942; Moldenke, *Alph. List Invalid Names* 1 & 3. 1942; Moldenke, *Alph. List Cit.* 1: 167, 168, & 319 (1946) and 2: 331, 337, 343, 432, 557, 587, 622, & 631. 1948; Moldenke, *Phytologia* 2: 435,

fig. 1. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 65, 71, 74, & 174. 1949; Moldenke, *Alph. List Cit.* 3: 675, 711, 823, 915, 955, & 956 (1949) and 4: 988, 1014, 1067, & 1072. 1949; Moldenke, *Phytologia* 4: 349. 1953; Moldenke, *Résumé* 64, 74, 81, 85, 228, 231, & 440. 1959.

Illustrations: Moldenke, *Phytologia* 2: 435, fig. 1. 1948.

This species has been collected in anthesis also in May. Maguire & Fanshawe describe it as a secondary growth shrub 3 meters tall, with a green calyx, blooming in October, infrequent at 500 meters altitude.

Additional citations: BRITISH GUIANA: Maguire & Fanshawe 32320 (N). COLOMBIA: Vaupés: Schultes & Cabrera 19252 (W-2113116). BRAZIL: Amazonas: Fosberg 29298 (Be-59481); Fröes 28238 (Z); J. S. Rodrigues 106 (Bm). Guaporé: J. F. Silva 54 (Be-77725).

AEGIPHILA BRASILIENSIS Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 115. 1933; Moldenke, *Brittonia* 1: 265, 306, & 477. 1934; Moldenke, *Phytologia* 1: 190. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 24. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35 & 84 (1942) and [ed. 2], 74 & 174. 1949; Moldenke, *Alph. List Cit.* 4: 1017 & 1020. 1949; Moldenke, *Résumé* 85 & 440. 1959; Angely, *Ind. Ang.* 9. 1959.

AEGIPHILA BREVIFLORA (Rusby) Moldenke

Additional and corrected literature: H. H. Rusby, *Mem. N. Y. Bot. Gard.* 7: 340 & 341. 1927; Moldenke, *Geogr. Distrib. Avicenn.* 27. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 39. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 39 & 84. 1942; Moldenke, *Alph. List Invalid Names* 39. 1942; Moldenke, *Alph. List Cit.* 1: 92 (1946) and 4: 1052. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 96 & 174. 1949; Moldenke, *Phytologia* 4: 428 & 431. 1953; Moldenke, *Résumé* 112, 341, & 440. 1959.

Illustrations: H. H. Rusby, *Mem. N. Y. Bot. Gard.* 7: 340. 1927.

AEGIPHILA BUCHTIENII Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 116. 1933; Moldenke, *Brittonia* 1: 278, 430-432, & 472. 1934; Moldenke, *Phytologia* 1: 192. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 27, 1939; Moldenke, *Phytologia* 2: 59. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 39 & 84. 1942; Moldenke, *Alph. List Cit.* 1: 76 (1946) and 4: 1060 & 1061. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 96 & 184. 1949; Moldenke, *Phytologia* 4: 349. 1953; Moldenke, *Résumé* 112 & 440. 1959.

AEGIPHILA CANDELABRUM Briq.

Additional literature: Moldenke, *Geogr. Distrib. Avicenn.* 24 & 28. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35, 40, & 84. 1942; Moldenke, *Alph. List Cit.* 1: 121, 201, 263, & 264 (1946), 2: 332, 337, & 553 (1948), and 3: 692. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74, 98, & 174. 1949; Moldenke, *Phytologia* 4: 385 & 431. 1953; Moldenke, *Résumé* 85, 115,

& 440. 1959.

Hassler describes the corolla of this species as yellowish-white and the plant as a shrub 1--3 meters tall. He misidentified it as A. cuspidata Mart.

Additional citations: PARAGUAY: Hassler 7974 (Ca--944316, N), 7974a (Ca--944315, N).

AEGIPHILA CAPITATA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 116. 1933; Moldenke, Brittonia 1: 254, 266, 335--336, & 472. 1934; Moldenke, Phytologia 1: 193. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Phytologia 1: 381. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 84. 1942; Moldenke, Alph. List Cit. 1: 78. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 4: 349. 1953; Moldenke, Résumé 85 & 440. 1959; Angely, Ind. Ang. 9. 1959.

AEGIPHILA CASSELIAEFORMIS Schau.

Literature: Schau. in A. DC., Prodr. 11: 651. 1847; Schau. in Mart., Fl. Bras. 9: 285. 1851; Jacks., Ind. Kew. 1: 46. 1893; Moldenke, Brittonia 1: 265, 303--304, & 472. 1934; Moldenke, Phytologia 1: 193. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 84. 1942; Moldenke, Alph. List Cit. 1: 78 (1946) and 3: 838. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 4: 350. 1953; Moldenke, Résumé 85 & 440. 1959; Angely, Ind. Ang. 9. 1959.

AEGIPHILA CAUCENSIS Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 117. 1933; Moldenke, Brittonia 1: 273, 411, & 475. 1934; Moldenke, Phytologia 1: 193. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 84. 1942; Moldenke, Alph. List Cit. 1: 273 (1946), 3: 808 (1949), and 4: 1047. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58 & 174. 1949; Moldenke, Résumé 64 & 440. 1959.

AEGIPHILA CAYMANENSIS Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 118. 1933; Moldenke, Brittonia 1: 264, 353--354, & 474. 1934; Moldenke, Phytologia 1: 193. 1937; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 84. 1942; Moldenke, Alph. List Cit. 1: 309 (1946) and 2: 548. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 174. 1949; Moldenke, Résumé 54 & 440. 1959.

AEGIPHILA CEPHALOPHORA Standl.

Literature: Standl., Field Mus. Publ. Bot. 4: 156. 1929; Journ. Arnold Arb. 11: 127. 1930; J. A. Clark, Card Ind. Gray Herb. 1930; Moldenke, Brittonia 1: 270, 414--415, 472, & 474. 1934; Moldenke, Phytologia 1: 193--194. 1937; Moldenke, Geogr. Distrib. Avicenn. 17. 1939; Moldenke, Phytologia 2: 60. 1941; Moldenke, Known Geogr.

Distrib. Verbenac., [ed. 1], 23 & 84. 1942; Moldenke, Alph. List Cit. 1: 15, 29, 320, 323, & 325 (1946), 2: 607 (1948), and 4: 1055. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 40 & 174. 1949; Moldenke, Résumé 47 & 440. 1959.

Johnston describes this species as a vine climbing high on forest margins, fruiting in November, with orange fruits 15 mm. in diameter on pendent fruiting-stems.

Additional citations: PANAMA: Canal Zone: I. M. Johnston 1661 (Mi).

AEGIPHILA CHRYSANTHA Hayek

Additional literature: Moldenke, Brittonia 1: 278 & 423. 1934; Moldenke, Alph. List Common Names 12. 1939; Moldenke, Geogr. Distrib. Avicenn. 24 & 27. 1939; Moldenke, Prelim. Alph. List Invalid Names 2. 1940; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Alph. List Invalid Names 1 & 2. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33--35, 39, & 84. 1942; Moldenke, Alph. List Cit. 1: 136, 180, 303, & 326 (1946), 2: 327, 330, 331, 340, 347, 436, 616, & 628 (1948), 3: 692, 695, 823, 900, & 901 (1949), and 4: 988, 1036, & 1058. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69, 71, 74, 96, & 174. 1949; Moldenke, Phytologia 4: 385--386. 1953; Moldenke, Mem. N. Y. Bot. Gard. 9: 175. 1955; Moldenke, Résumé 78, 81, 85, 112, 228, 230, & 440. 1959.

This species is said by Fröes to inhabit the "caatinga" region, while Asplund found it in "rastrojo", with light-yellow flowers in February.

Additional citations: ECUADOR: Los Ríos: Asplund 15539 (S). Manabi: Eggers 14348, in part (B). Province undetermined: Fagerlind & Wibom 2610a (S). BRAZIL: Amazonas: Fröes 28853 (Z).

AEGIPHILA CHRYSANTHA var. GLABRA Moldenke

Literature: Moldenke, Phytologia 2: 60--61. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 84. 1942; Moldenke, Alph. List Cit. 2: 336 & 616. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 174. 1949; Moldenke, Résumé 81 & 440. 1959.

AEGIPHILA CONTURBATA Moldenke

Additional literature: Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 84 (1942) and [ed. 2], 74 & 174. 1949; Moldenke, Alph. List Cit. 3: 694 & 770. 1949; Moldenke, Phytologia 4: 431--432. 1953; Moldenke, Résumé 85 & 440. 1959; Angely, Ind. Ang. 9. 1959.

The species is said by Fröes to inhabit roadsides.

Additional citations: BRAZIL: Maranhão: Fröes 25641 (Be--51887).

AEGIPHILA CORDATA Poepp.

Literature: Walp., Repert. 4: 118. 1845; Schau. in A. DC., Prodr. 11: 650. 1847; Bocq., Adansonia 3: 190. 1862; Jacks., Ind. Kew. 1: 46. 1893; Bull. Torrey Bot. Club 60: 393. 1933; Moldenke,

Brittonia 1: 277, 443--445, & 475. 1934; Moldenke, *Phytologia* 1: 195. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 23 & 24. 1939; Moldenke, *Phytologia* 1: 381 (1940) and 2: 61. 1941; Moldenke, *Suppl. List Invalid Names* 1. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 34, 35, & 84. 1942; Moldenke, *Alph. List Invalid Names* 1. 1942; Moldenke, *Alph. List Cit.* 1: 326. 1946; Moldenke, *Phytologia* 2: 390--391 (1947) and 2: 434. 1948; Moldenke, *Alph. List Cit.* 2: 340 & 347 (1948), 3: 695 & 823 (1949), and 4: 1015. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 58, 71, 74, & 174. 1949; Moldenke, *Résumé* 81, 85, 228, & 440. 1959.

AEGIPHILA CORDATA var. COLOMBIANA Moldenke

Literature: Moldenke, *Geogr. Distrib. Avicenn.* 18. 1939; Moldenke, *Phytologia* 1: 381--382 (1940) and 2: 61. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 30 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 134 & 265. 1946; Moldenke, *Phytologia* 2: 391. 1947; Moldenke, *Alph. List Cit.* 2: 351. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 58 & 174. 1949; Moldenke, *Résumé* 64 & 440. 1959.

AEGIPHILA CORDIFOLIA (Ruiz & Pav.) Moldenke

Literature: Ruiz & Pav., *Fl. Peruv. & Chil.* 1: 50, pl. 77a. 1798; Poir. in Lam., *Encycl. Méth. Bot. Suppl.* 2: 33. 1811; Roem. & Schult. in L., *Syst. Veg.* 3: 95. 1818; Cham., *Linnaea* 7: 110. 1832; Dietr., *Syn. Pl.* 1: 429. 1839; Schau. in A. DC., *Prodr.* 11: 654. 1847; Schau. in Mart., *Fl. Bras.* 9: 288. 1851; Pritzell, *Icon. Bot. Ind.* 1: 188. 1866; Jacks., *Ind. Kew.* 1: 386. 1893; Stapf, *Ind. Lond.* 1: 525. 1929; Moldenke, *Brittonia* 1: 185. 1932; J. A. Clark, *Card Ind. Gray Herb.* 1933; Moldenke, *Brittonia* 1: 278, 445--446, & 475. 1934; Moldenke, *Phytologia* 1: 195 & 223. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 23. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 10. 1940; Moldenke, *Phytologia* 1: 382 (1940) and 2: 61. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 34 & 85. 1942; Moldenke, *Alph. List Invalid Names* 8. 1942; Moldenke, *Alph. List Cit.* 1: 317 (1946) and 2: 335 & 338. 1948; Moldenke, *Phytologia* 2: 434. 1948; Moldenke, *Alph. List Cit.* 3: 686, 694, 713, 880, & 881. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 71 & 174. 1949; Moldenke, *Phytologia* 4: 350. 1953; Moldenke, *Résumé* 81, 242, & 440. 1959. Illustrations: Ruiz & Pav., *Fl. Peruv. & Chil.* 1: pl. 77a. 1798.

AEGIPHILA CORIACEA Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 118. 1933; Moldenke, *Brittonia* 1: 265, 318--319, & 473. 1934; Moldenke, *Phytologia* 1: 195--196. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 24. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 212. 1946; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74 & 174. 1949; Moldenke, *Résumé* 85 & 440. 1959; Angely, *Ind. Ang.* 9. 1959.

AEGIPHILA COSTARICENSIS Moldenke

Additional synonymy: *Aegiphila costarivensis* Moldenke, Alph. List Cit. 1: 287, sphalm. 1946.

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 119. 1933; Moldenke, Brittonia 1: 255, 263, 294—295, 475, & 476. 1934; Standl., Field Mus. Publ. Bot. 17: 206—207. 1937; Moldenke, Phytologia 1: 196 (1937) and 1: 290—291. 1938; Standl., Field Mus. Publ. Bot. 18: 994—995. 1938; Moldenke, Geogr. Distrib. Avicenn. 12, 14, & 16. 1939; Moldenke, Prelim. Alph. List Invalid Names 21. 1940; Moldenke, Phytologia 1: 382 (1940) and 2: 61. 1941; Moldenke, Alph. List Invalid Names 19. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 19, 22, & 84. 1942; Moldenke, Alph. List Cit. 1: 287 & 326. 1946; Moldenke, Phytologia 2: 391 (1947) and 2: 434. 1948; Moldenke, Alph. List Cit. 2: 327, 342, 345, 346, 348, 389, 390, & 437 (1948), 3: 714, 821, 940, 945, & 962 (1949), and 4: 1000, 1040, 1045, 1052, 1053, 1058, & 1072. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28, 34, 38, & 174. 1949; Matuda, Am. Midl. Nat. 44: 575. 1950; Moldenke, Phytologia 4: 350. 1953; Moldenke, Résumé 33, 41, 46, 266, & 440. 1959.

Matuda collected this species at an altitude of 10 meters, blooming in January.

Additional citations: MEXICO: Chiapas: Matuda 6152 (M), 17375 (N). COSTA RICA: Cartago: Tonduz 8564 (M).

AEGIPHILA CRENATA Moldenke

Additional literature: Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Cit. 1: 171 & 172 (1946), 2: 329, 344, 489, & 598 (1948), and 3: 694, 751, 844, 900, & 921. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 4: 386. 1953; Angely, Fl. Paran. 12: 17. 1958; Moldenke, Résumé 85 & 440. 1959; Angely, Ind. Ang. 9. 1959; Angely, Fl. Paran. 16: 36. 1960.

AEGIPHILA CUATRECASASI Moldenke

Literature: Moldenke, Phytologia 2: 7—8 & 62. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 1: 133 & 134. 1946; Moldenke, Phytologia 2: 391. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 54. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58 & 174. 1949; Moldenke, Alph. List Cit. 4: 1076 & 1215. 1949; Moldenke, Phytologia 4: 350. 1953; Moldenke, Résumé 64 & 440. 1959.

Additional citations: COLOMBIA: Huila: E. L. Little Jr. 7940 (N).

AEGIPHILA CUNEATA Moldenke

Literature: Moldenke, Brittonia 1: 185—186. 1932; J. A. Clark, Card. Ind. Gray Herb. 1933; Moldenke, Brittonia 1: 263, 292—294, & 474. 1934; Moldenke, Phytologia 1: 196—197. 1937; Moldenke, Geogr. Distrib. Avicenn. 23 & 24. 1939; Moldenke, Phytologia 1: 382 (1940) and 2: 62. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 35, & 85. (1942) & [ed. 2], 71, 74, & 174. 1949.

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A NEW DODONAEA FROM MOLOKAI, HAWAII

Otto & Isa Degener

Local officials, not realizing that 99 percent of our native phanerogams are endemic or not impressed by this fact, are now subjecting our public lands to intense "conservation." One of their projects for such areas not suitable for the pursuits of agriculture or animal husbandry is to introduce Continental game animals such as antelope, deer and mouflon; another, to plant them to exotic timber trees such as pines and Samanea saman (Jacq.) Merr. Thus we are efficiently rushing a native flora, that took ten million years to evolve, to extinction; and slowly strangling our lucrative tourist trade. An example of this fast-vanishing flora, discovered while conducting field work under auspices of the National Science Foundation, is the following:

DODONAEA ERIOCARPA var. SHERFFII Deg. & Deg., var. nov.

Arbor 3 m. alta; foliis 40--60 mm. longis et 6--9 mm. latis; capsulis 4-alatis, 17 mm. longis, 12 mm. latis.

Three meter high entirely glabrous somewhat varnished tree with abundant leafy erect twigs. Leaves crowded, narrowly oblanceolate, commonly 40--60 mm. long and 6--9 mm. wide, acuminate to sessile or subsessile base, acuminate to minutely rounded apex, subentire. Capsule inflated, stramineous to crimson, 4-winged, 17 mm. long, 12 mm. wide including the 3 mm. wings.

Type locality: "Makai of Maunahui, Molokai. On open ridge in scrub." This variety is on the verge of extinction due not to introduced herbivores to which it seems unpalatable, but to the planted exotic pines whose fallen needles are helping kill all surrounding vegetation. Type specimen: Degener & Degener no. 24,952, July 30, 1958. This taxon is named for Dr. Earl E. Sherff whose splendid monographic work on the genus Dodonaea in the Hawaiian Islands facilitates the recognition of novelties.

GOULDIA IN HAWAII

Otto & Isa Degener

In preparing a paper for the Pacific Science Congress to be held in Honolulu this Fall, we had occasion to review literature on the rubiaceous genus Gouldia. We believe we are contributing a somewhat better understanding of the genus as it is found in the Hawaiian Islands by the following nomenclatural changes, mostly altering monographer F. R. Fosberg's various, to us seemingly too conservative, taxa to the next higher rank:

1. G. GOULDIA OVATA var. HETEROPHYLLA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. heterophylla Fosb. in B. P. Bishop Mus. Bull. 147: 52. 1937).
2. G. OVATA var. KALAUPAPA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. kalaupapa Fosb. ibid. 51).
3. G. OVATA var. LYDGATEI (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. lydgatei Fosb. ibid. 53).
4. G. OVATA var. MAKAWAOENSIS (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. makawaoensis Fosb. ibid. 50).
5. G. OVATA var. MAUNAHUI (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. maunahui Fosb. ibid. 51).
6. G. OVATA var. MEMBRANACEA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. membranacea Fosb. ibid. 53).
7. G. OVATA var. OAHUENSIS (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. oahuensis Fosb. in Britt. 8: 176. 1956).
8. G. OVATA var. OBOVATA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. obovata Fosb. in Bull. Torr. Bot. Cl. 70: 391. 1943).
9. G. OVATA var. PETIOLATA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. petiolata Fosb. in B. P. Bishop Mus. Bull. 147: 53. 1937).
10. G. OVATA var. PUNAULA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. punaula Fosb. ibid. 53).
11. G. OVATA f. RUSSII (Fosb.) Deg. & Deg. (Syn. G. terminalis var. kaala f. Russii Fosb. in B. P. Bishop Mus. Bull. 147: 49. 1937; G. terminalis var. ovata f. russii (Fosb.) Fosb. in Britt. 8: 176. 1956).
12. G. OVATA var. SANTALIFOLIA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. santalifolia Fosb. in B. P. Bishop Mus. Bull. 147: 51. 1937).
13. G. OVATA var. STOREYI (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. Storeyi Fosb. ibid. 52).
14. G. OVATA var. SUEHIROAE (Fosb.) Deg. & Deg. (Syn. G. terminalis var. ovata f. Suehiroae Fosb. ibid. 52).
15. G. CORDATA var. ACUMINATA (Fosb.) Deg. & Deg. (Syn. G. terminalis var. cordata f. acuminata Fosb. ibid. 45).
16. G. CORDATA var. MOLOKAIENSIS (Fosb.) Deg. & Deg. (Syn. G. terminalis var. cordata f. molokaiensis Fosb. ibid. 45).
17. G. CORDATA var. NEALAE (Fosb.) Deg. & Deg. (Syn. G. terminalis var. cordata f. Nealae Fosb. ibid. 45).
18. G. AXILLARIS var. HAWAIIENSIS (Fosb.) Deg. & Deg. (Syn. G. Hillebrandii var. hawaiiensis Fosb. ibid. 61).
19. G. AXILLARIS var. NODOSA (Fosb.) Deg. & Deg. (Syn. G. Hillebrandii var. nodosa f. eunodosa Fosb. ibid. 61).
20. G. AXILLARIS var. NODOSA f. LANCIFOLIA (Fosb.) Deg. & Deg. (Syn. G. Hillebrandii var. nodosa f. lancifolia Fosb. ibid. 61).
21. G. AXILLARIS f. GLABRIFOLIA (Fosb.) Deg. & Deg. (Syn. G. Hillebrandii var. typica f. glabrifolia Fosb. ibid. 60).

22. G. AXILLARIS var. MICROPHYLLA (Fosb.) Deg. & Deg. (Syn. G. Hillebrandii var. typica f. microphylla Fosb. *ibid.* 60).

Among the 64 categories of Dr. Fosberg's putative hybrids, discussed in 19 pages, may lurk specimens that are true forms and even true varieties without any hybrid admixture; conversely, in some of the above putative varieties recognized by us may lurk some nothomorphs developed by recent or more likely ancient hybridization and backcrossings. Hence the excellent monograph by Dr. Fosberg should not lull the collector into thinking that the study of local Gouldiae has been completed. He should continue to gather and study representatives of this genus, whose 2n chromosome number varies from approximately 72 to 105, in the field and attempt to untangle questions of hybridization experimentally.

ADDITIONAL NOTES ON THE GENUS AEGIPHILA. XV

Harold N. Moldenke

AEGIPHILA CUNEATA Moldenke

Additional literature: Moldenke, *Brittonia* 1: 300. 1934; Moldenke, *Alph. List Cit.* 1: 325 (1946), 2: 343 & 612 (1948), and 4: 1015. 1949; Moldenke, *Résumé* 81, 85, & 440. 1959; Moldenke, *Phytologia* 7: 464. 1961.

AEGIPHILA CUNEATA var. HIRSUTISSIMA Moldenke

Literature: Moldenke, *Phytologia* 4: 173 & 351. 1953; Moldenke, *Résumé* 81 & 440. 1959.

AEGIPHILA DENTATA Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 120. 1933; Moldenke, *Brittonia* 1: 267, 311, & 336—337. 1934; Moldenke, *Phytologia* 1: 197. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 24. 1939; Moldenke, *Phytologia* 1: 382. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 177 (1946) and 2: 365 & 534. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74 & 174. 1949; Moldenke, *Résumé* 85 & 440. 1959.

AEGIPHILA DEPPEANA Steud.

Additional literature: Standl., *Field Mus. Publ. Bot.* 18: 995. 1938; Moldenke, *Alph. List Common Names* 27. 1939; Moldenke, *Geogr. Distrib. Avicenn.* 12, 16, 17, 18, & 35. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 1 & 3. 1940; Moldenke, *Suppl. List Invalid Names* 1. 1941; Moldenke, *Alph. List Invalid Names* 1 & 3. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 15, 22, 23, 30, 33, 70, & 85. 1942; Moldenke, *Alph. List Cit.* 1: 7, 27, 40, 163, 169, 190, 218, 243, 253, 272, 285, 302, 321, 322, & 326

(1946) and 2: 339, 342, 343, 345, 347, 432, 459, 503, 603, & 607. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 56. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28, 34, 38, 40, 55, 68, 156, & 174. 1949; Moldenke, Alph. List Cit. 3: 659, 695, 705, 709, 758, 768, 779, 780, 786, 801, 806, 817, 853, 887, 895, 900, 901, 918, 919, 925, 947, & 962 (1949) and 4: 1006, 1024, 1025, 1028, 1030, 1031, 1033, 1043, 1051, 1053--1055, 1061, 1077, 1080, 1097, 1098, 1109, 1111, 1131, 1175, 1230, 1248, & 1290. 1949; Moldenke, Phytologia 4: 386. 1953; Moldenke, Résumé 33, 40, 46, 47, 64, 77, 212, 228, 230, & 440. 1959.

Allen describes the flowers of this plant as "star-shaped", blooming in July.

Additional citations: COLOMBIA: Magdalena: C. Allen 150 (E-1014028).

AEGIPHILA DUCKEI Moldenke

Literature: Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Phytologia 1: 383--384. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Cit. 1: 169 (1946) and 2: 446. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 4: 351. 1953; Moldenke, Résumé 85 & 440. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA ELATA Sw.

Additional & emended literature: Hughes, Nat. Hist. Barbados. 156. 1750; Griseb., Abhand. Königl. Gesell. Wissen. Götting. 7: 257. 1857; Alfaro, An. Mus. Nac. Rep. Costa Rica 1 (2): 60. 1888; Jacks., Ind. Kew. 1: 46. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 166. 1894; Moldenke, Brittonia 1: 252, 254, 257--260, 275, 279, 320, 364, 395--397, 449, 462--466, & 472--477. 1934; Standl., Field Mus. Publ. Bot. 18: 995. 1938; Moldenke, Alph. List Common Names 14 & 28. 1939; Moldenke, Geogr. Distrib. Avicenn. 4, 6, 7, 10, 12, 14--21, & 35. 1939; Moldenke in Pulle, Fl. Surin. 4 (2): 297 & 300--302. 1940; Moldenke, Prelim. Alph. List Invalid Names 1--4, 29, 33, & 39. 1940; Moldenke, Alph. List Invalid Names 1, 2, 27, & 33. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 19, 20, 23--33, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 2, 3, 7, 25, 27, 39, 40, 58--62, 65, 67, 80--82, 93, 109, 130, 131, 139, 156, 160, 161, 163, 179, 184--186, 188, 189, 192, 197, 198, 205, 208, 218, 232, 243, 253, 258, 259, 261, 272, 273, 286, 300, 303, 304, 306, 310--313, 315, & 317--321. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 327, 333, 340, 343, 346, 349, 350, 353, 389, 390, 403, 410, 411, 432, 436, 487, 501, 502, 528, 529, 543, 545, 549, 558, 567, 569, 578, 579, 604, 625, 642, 647, & 649--651 (1948), 3: 654, 664, 668, 675, 706, 714, 716, 720, 739, 749, 759, 771, 808, 809, 818--822, 826, 833, 847, 866, 867, 877, 880, 889, 892, 895, 902, 926, 928, 929, 959, 960, & 962 (1949), and 4: 981, 982, 986, 993, 995, 999, 1000, 1005--1007, 1009, 1013, 1018, 1026, 1027, 1030, 1033--1035, 1037, 1043--1045, 1047--1049, 1051, 1054, 1055, 1058--1063, 1068, 1074, 1077,

1080, 1097, 1129, 1131, 1132, 1134, 1136, 1143, 1145, 1146, 1151, 1152, 1162, 1192, 1247, & 1296. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 9, 28, 34, 36—38, 40, 42, 46, 47, 49, 54, 56, 58, 62, 65, 67, 68, 156, & 174. 1949; Miranda, Veget. Chiapas 328. 1953; Roig, Dicc. Bot. 2: 976. 1953; Moldenke, Phytologia 4: 386—387. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 405 & 407—408. 1955; Moldenke, Fam. 2 Verbenac. 24 & 26—27. 1955; Alain in León & Alain, Fl. Cuba 4: 309 & 310, fig. 132. 1957; Moldenke, Résumé 12, 33, 41, 43, 44, 46, 47, 50, 54, 56, 58, 61, 62, 64, 69, 74, 76, 77, 212, 228—232, 302, 321, 322, 341, & 440. 1959; Angely, Ind. Ang. 9. 1959.

Illustrations: Lindl., Bot. Reg. 11: 946. 1826; Alain in León & Alain, Fl. Cuba 4: fig. 132. 1957.

This species has also been collected in fruit in June and August, and has been found by collectors in secondary forests on riverbanks, in advanced forests, in savannas, and in high valleys. Stearn reports that the corolla is primrose-yellow and the anthers brown. He found the plant growing at 1000 feet altitude in Jamaica. The Kings collection cited below is anomalous in having truncate calyxes.

Additional citations: FLORIDA: Dade Co.: Buswell s.n. [Miami, 7-22-34] (Mi). MEXICO: Tabasco: Matuda 3031 (Mi), 3081 (Mi), 3406 (Mi). BRITISH HONDURAS: Gentle 3350 (Mi), 3569 (Mi), 3578 (Mi), 3579 (Mi). COSTA RICA: Alajuela: Brenes 20538 [20] (N). CUBA: Oriente: Alain, Acuña, & López Figueiras 5737 (Z); Ekman 2031 (N); C. Wright 429 [1860] (Ca—936917). Province undetermined: Linden 1798 (N). JAMAICA: Stearn 492 [Proctor 11774] (S). CAYMAN ISLANDS: Grand Cayman: Kings G.C.60 (N). VENEZUELA: Yaracuy: Aristeguieta & Pannier 1856 (N, N).

AEGIPHILA ELEGANS Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 259, 278, 414, 442, 458—461, & 474. 1934; Moldenke, Geogr. Distrib. Avicenn. 23 & 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 35, 39, & 85. 1942; Moldenke, Alph. List Cit. 1: 323 & 325 (1946), 2: 345, 612, & 623 (1948), and 4: 1015 & 1064. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71, 74, 96, & 174. 1949; Moldenke, Phytologia 4: 387—388. 1953; Moldenke, Résumé 64, 81, 85, 112, & 440. 1959.

Schultes & Cabrera describe this species as a medium-sized tree, 20 feet tall, with green-yellow fruit in September.

Additional citations: COLOMBIA: Vaupés: Schultes & Cabrera 17298 (Ss, Z).

AEGIPHILA ELONGATA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 121. 1933; Moldenke, Brittonia 1: 251, 276, 429—430, & 472. 1934; Moldenke, Phytologia 1: 200. 1937; Moldenke, Geogr. Distrib. Avicenn. 27. 1939; Moldenke, Phytologia 1: 385 (1940) and 2: 62. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 &

85. 1942; Moldenke, *Alph. List Cit.* 1: 76 & 326 (1946) and 4: 1061. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 96 & 174. 1949; Moldenke, *Phytologia* 4: 352. 1953; Moldenke, *Résumé* 112 & 440. 1959.

AEGIPHILA EXIGUIFLORA Moldenke

Literature: Moldenke, *Geogr. Distrib. Avicenn.* 24. 1939; Moldenke, *Phytologia* 1: 385--386. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 168 (1946) and 2: 445. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74 & 174. 1949; Moldenke, *Phytologia* 4: 352. 1953; Moldenke, *Résumé* 85 & 440. 1959; Angely, *Ind. Ang.* 10. 1959.

Lima describes this species as a small tree or shrub, with a corky stem, fruiting in April, growing with *Curatella americana* L. and with it forming the typical trees of the formation.

Additional citations: BRAZIL: Pará: D. A. Lima 53-1233 (Be--80783).

AEGIPHILA FALCATA Donn. Sm.

Additional & emended literature: Moldenke, *Brittonia* 1: 247, 252, 270, 363--364, 373, 465, 467, 473, 475, & 476. 1934; Standl., *Field Mus. Publ. Bot.* 18: 995. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 12, 14, 16, & 17. 1939; Moldenke, *Alph. List Common Names* 34. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 4. 1940; Moldenke, *Alph. List Invalid Names* 4. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 15, 19, 22, 23, & 85. 1942; Moldenke, *Alph. List Cit.* 1: 42, 89, 170, 320, 325, & 326 (1946), 2: 389, 435, & 500 (1948), 3: 714, 716, 819--821, 834, 869, 948, 962, & 978 (1949), and 4: 1000, 1001, 1019, 1020, 1025, 1029, 1031, 1042, 1045, 1046, 1048, 1058, 1100, & 1114. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 28, 34, 38, 40, & 174. 1949; H. N. & A. L. Moldenke, *Anal. Inst. Biol. Mex.* 20: 2. 1949; Moldenke, *Phytologia* 4: 388. 1953; Miranda, *Veget. Chiapas* 260, 328, & 329. 1953; Moldenke, *Résumé* 33, 41, 46, 47, 232, & 440. 1959.

Matuda found this species growing in bush country, fruiting in June.

Additional citations: MEXICO: Chiapas: Matuda 666 (W--1688400), 16624 (Mi). GUATEMALA: Suchitepéquez: Steyermark 47819 (Ew).

AEGIPHILA FARINOSA Moldenke

Literature: Moldenke, *Phytologia* 2: 306--307 & 392. 1947; Moldenke, *Alph. List Cit.* 4: 1215. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 58 & 174. 1949; Moldenke, *Résumé* 64 & 440. 1959.

AEGIPHILA FASCICULATA Donn. Sm.

Literature: J. D. Sm., *Bot. Gaz.* 57: 425--426. 1914; J. A. Clark, *Card. Ind. Gray Herb.* 1914; Prain, *Ind. Kew. Suppl.* 5: 6. 1921; Standl., *Field Mus. Publ. Bot.* 10: 334--335, pl. 57. 1931; Moldenke, *Brittonia* 1: 254, 265, 298, 300--301, & 477. 1934;

Moldenke, *Phytologia* 1: 200 & 223. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 14. 1939; Moldenke, *Phytologia* 1: 387 (1940) and 2: 63. 1941; Moldenke, *Suppl. List Invalid Names* 1. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 19 & 85. 1942; Moldenke, *Alph. List Invalid Names* 1. 1942; Moldenke, *Alph. List Cit.* 1: 325 (1946), 2: 437 (1948), and 4: 1013 & 1058. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 34 & 174. 1949; Moldenke, *Résumé* 41, 228, & 440. 1959.

AEGIPHILA FENDLERI Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 121--122. 1933; Moldenke, *Brittonia* 1: 278, 446--447, 473, & 474. 1934; Moldenke, *Phytologia* 1: 200--201. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 19. 1939; Moldenke, *Phytologia* 2: 63. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 32 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 99 & 198. 1946; Moldenke, *Phytologia* 2: 392--393. 1947; H. N. & A. L. Moldenke, *Pl. Life* 2: 58. 1948; Moldenke, *Alph. List Cit.* 2: 603 (1948), 3: 974 (1949), and 4: 1077. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 62 & 174. 1949; Moldenke, *Phytologia* 4: 352. 1953; Moldenke, *Résumé* 69 & 440. 1959.

Tamayo describes this plant as more or less of a climber, blooming in February, found at an altitude of 1550 meters.

Additional citations: VENEZUELA: Aragua: Tamayo 1643 (Ca-734195).

AEGIPHILA FERRUGINEA Hayek & Spruce

Additional & emended literature: Moldenke, *Brittonia* 1: 259, 266, 320--321, 347, 424, 473, 474, & 476. 1934; Moldenke, *Alph. List Common Names* 31. 1939; Moldenke, *Geogr. Distrib. Avicenn.* 22. 1939; Moldenke, *Suppl. List Invalid Names* 1. 1941; Moldenke, *Alph. List Invalid Names* 1. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 33 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 202, 320, 323, & 326 (1946), 2: 328, 332, 338, 340, 350, 464, & 642 (1948), 3: 690, 695, 731, 758, 805, 857, 950, 956, & 957 (1949), and 4: 1018, 1058, 1062, 1127, 1221, & 1247. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 69 & 174. 1949; Moldenke, *Phytologia* 4: 388. 1953; Moldenke, *Mem. N. Y. Bot. Gard.* 9: 175. 1955; Moldenke, *Résumé* 78, 228, & 440. 1959.

Asplund reports finding this plant on the banks of a rivulet.

Additional citations: ECUADOR: Azuay: Asplund 17761 (S). Pichincha: Asplund 6456 (N).

AEGIPHILA FILIPES Mart. & Schau.

Literature: Schau. in A. DC., *Prodr.* 11: 652. 1847; Schau. in Mart., *Fl. Bras.* 9: 286. 1851; Jacks., *Ind. Kew.* 1: 46. 1893; H. H. Rusby, *Bull. Torrey Bot. Club* 27: 81. 1900; J. A. Clark, *Card Ind. Gray Herb.* 1901; Thiselt.-Dyer, *Ind. Kew. Suppl.* 2: 4. 1904; Moldenke, *Brittonia* 1: 247, 252, 272, 366--368, 384, 389, 395, 428, 473, & 475--477. 1934; Moldenke, *Phytologia* 1: 201 & 223--224 (1937) and 1: 291. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 23, 24, & 27. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 2

& 3. 1940; Moldenke, *Phytologia* 1: 387—388 (1940) and 2: 64. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 23, 30, 34, 35, 39, & 85. 1942; Moldenke, *Alph. List Invalid Names* 1 & 3. 1942; Raimondi, *Bol. Mus. Hist. Nat. Jav. Prado* 7: 244. 1943; Moldenke, *Alph. List Cit.* 1: 167, 168, 271, 289, 303, 323, & 324. 1946; Moldenke, *Phytologia* 2: 393. 1947; Moldenke, *Alph. List Cit.* 2: 331, 337, 345, 433, 435, 445, 503, 612, 622, & 623. 1948; Moldenke, *Phytologia* 2: 436. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 40, 58, 71, 74, 96, & 174. 1949; Moldenke, *Alph. List Cit.* 3: 692, 710—712, 809, 838, 855, 884, 947, 955, & 959 (1949) and 4: 988, 1014, 1015, 1030, 1051, 1058, 1064, 1076, 1130, 1131, & 1133. 1949; Moldenke, *Phytologia* 4: 352 & 388. 1953; Moldenke, *Résumé* 47, 64, 81, 85, 112, 228—230, & 440. 1959; Angely, *Ind. Ang.* 10. 1959.

AEGIPHILA FLORIBUNDA Moritz & Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 122—123. 1933; Moldenke, *Brittonia* 1: 271, 371—374, & 473—475. 1934; Moldenke, *Phytologia* 1: 201—202. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 19. 1939; Moldenke, *Phytologia* 2: 64. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 32 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 198. 1946; Moldenke, *Phytologia* 2: 393 (1947) and 2: 347 & 436. 1948; Moldenke, *Alph. List Cit.* 2: 603 (1948) and 3: 695 & 749. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 62 & 174. 1949; Moldenke, *Résumé* 69, 422, & 440. 1959.

AEGIPHILA FLUMINENSIS Vell.

Additional & emended literature: Moldenke, *Brittonia* 1: 254, 265, 316—318, 320, 336, 436, 437, & 472—477. 1934; Moldenke, *Geogr. Distrib. Avicenn.* 24. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 2 & 3. 1940; Moldenke, *Alph. List Invalid Names* 1 & 3. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 44, 45, 78, 98, 113, 117, 168, 171, 177, 223, 226, 236, 250, 276, & 323 (1946), 2: 367, 414, 433, 444, & 534 (1948), 3: 658, 684, 710, 736, 737, 800, 855, 856, 890, 900, 915, 920, 922, & 963 (1949), and 4: 1017, 1020, 1087, 1097, 1106, 1113, & 1123—1125. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74 & 174. 1949; Moldenke, *Phytologia* 4: 353 & 388—389. 1953; Moldenke, *Résumé* 85, 228—230, & 440. 1959; Angely, *Ind. Ang.* 10. 1959; Angely, *Fl. Paran.* 16: 36. 1960.

Occhioni describes this species as a shrub with white flowers, blooming in December.

Additional citations: BRAZIL: Federal District: Occhioni 798 (Rd). Paraná: Hatschbach 6616 (Z). Rio de Janeiro: Emygdio 1164 (Ca—169432); Patschke 148 (E).

AEGIPHILA FOETIDA Urb.

Additional & emended literature: Moldenke, *Brittonia* 1: 254, 264, 357—359, 362, 472, 475, & 476. 1934; Moldenke, *Geogr. Distrib. Avicenn.* 6. 1939; Moldenke, *Alph. List Common Names* 28.

1939; Moldenke, Prelim. Alph. List Invalid Names 3. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 85. 1942; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Alph. List Cit. 1: 6, 7, 162, 273, & 325 (1946), 2: 327 & 529 (1948), 3: 706 & 833 (1949), and 4: 982, 1043, & 1145. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 174. 1949; Moldenke, Phytologia 4: 389. 1953; Moldenke, Résumé 54, 230, & 440. 1959.

AEGIPHILA FROESI Moldenke

Literature: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 3: 107 (1949) and 4: 353. 1953; Moldenke, Résumé 85 & 440. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA GLABRATA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 253, 269, 374—375, & 474. 1934; J. A. Clark, Card Ind. Gray Herb. 1934; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Cit. 1: 323 (1946), 2: 611 (1948), and 4: 1060. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 174. 1949; Moldenke, Phytologia 5: 389. 1953; Moldenke, Résumé 81 & 440. 1959.

AEGIPHILA GLANDULIFERA Moldenke

Additional synonymy: Aegiphila hlandulifera Moldenke, Alph. List Cit. 2: 345, sphalm. 1948.

Additional & emended literature: Moldenke, Brittonia 1: 252, 269, 272, 364—366, 368, 472—475, & 477. 1934; Standl., Field Mus. Publ. Bot. 18: 996. 1938; Moldenke, Geogr. Distrib. Avicenn. 18 & 22—24. 1939; Moldenke, Alph. List Common Names 8. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22, 23, 30, 33—35, & 85. 1942; Moldenke, Alph. List Cit. 1: 12, 59, 134, 145, 161, 236, 243, 265, 267, 268, & 323. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 331, 345, 390, 553, 616, & 623 (1948), 3: 806, 818, 823, 870, & 918 (1949), and 4: 988, 1036, 1062, 1067, 1070, 1073, 1120, 1142, & 1221. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 38, 40, 58, 69, 71, 74, & 174. 1949; Barkley, Determinac. Ejemp. Herb. Fac. Agron. Medellin 2 (1): 17. 1950; Moldenke, Phytologia 4: 389. 1953; Moldenke, Résumé 46, 47, 64, 78, 81, 85, & 440. 1959.

Schultes & Cabrera state that this plant is a vine with whitish flowers. Sneider found it growing at 1000 meters altitude, says that the flowers are greenish-white or light-lilac, and misidentified it as "Clerodendron sp."

Additional citations: COLOMBIA: Chocó: Sneider A.64 (S), A.221 (S), s.n. [3.VI.1940] (S). Vaupés: Schultes & Cabrera 17362 (W—2113108).

AEGIPHILA GLANDULIFERA var. PARAËNSIS Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 123. 1933; Moldenke, Brittonia 1: 272, 366, 472, & 474. 1934; Moldenke, Phy-

tologia 1: 203. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Phytologia 1: 388 (1940) and 2: 64. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Cit. 1: 79 & 236. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 341, 345, 445, 612, 622, & 624 (1948), 3: 751 (1949), and 4: 1060. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 174. 1949; Moldenke, Phytologia 4: 353. 1953; Moldenke, Résumé 85, 229, & 440. 1959.

AEGIPHILA GLANDULIFERA var. **PYRAMIDATA** L. C. Rich. & Moldenke

Additional literature: Moldenke, Alph. List Common Names 29. 1939; Moldenke, Geogr. Distrib. Avicenn. 18, 19, 21, & 24. 1939; Moldenke, Prelim. Alph. List Invalid Names 3. 1940; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 33, 35, & 85 (1942) and [ed. 2], 58, 62, 68, 74, & 174. 1949; Moldenke, Alph. List Cit. 3: 749 & 853 (1949) and 4: 1006. 1949; Moldenke, Phytologia 4: 389 & 432. 1953; Moldenke, Résumé 65, 69, 77, 86, 231, & 440. 1959.

Wurdack & Adderley describe this plant as a vine, with pale-yellow flowers, growing in shrubs, and blooming in July, frequent along trails at 100 meters altitude.

Additional citations: VENEZUELA: Amazonas: Wurdack & Adderley 43392 (N, S).

AEGIPHILA GLEASONII Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 123. 1933; Moldenke, Brittonia 1: 265, 301--303, & 473. 1934; Moldenke, Phytologia 1: 204. 1937; Moldenke, Geogr. Distrib. Avicenn. 20. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 85. 1942; Moldenke, Alph. List Cit. 1: 238. 1946; Moldenke, Phytologia 2: 394. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 61. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 65 & 175. 1949; Moldenke, Phytologia 4: 354. 1953; Moldenke, Résumé 74 & 440. 1959.

AEGIPHILA GLOMERATA Benth.

Literature: Benth., Bot. Voy. Sulph. 154. 1844; Walp., Ann. Bot. 1: 544. 1848; Jacks., Ind. Kew. 1: 46. 1893; Moldenke, Brittonia 1: 277, 438--440, 473, & 476. 1934; Moldenke, Phytologia 1: 204. 1937; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 34, & 84. 1942; Moldenke, Alph. List Cit. 1: 30, 180, & 303. 1946; Moldenke, Phytologia 2: 394. 1947; Moldenke, Alph. List Cit. 2: 436 (1948), 3: 667 & 936 (1949), and 4: 1016, 1058, & 1079. 1949; Little, Carib. Forester 9: 269. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69, 70, & 175. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Phytologia 4: 354. 1953; Moldenke, Résumé 78, 81, & 441. 1959.

Asplund describes this rarely collected plant as a tall shrub, the uppermost branches and twigs subherbaceous, growing at the edge of a forest, flowering in February.

Additional citations: ECUADOR: Guayas: Asplund 15355 (S).

AEGIPHILA GLORIOSA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 123--124. 1933; Moldenke, Brittonia 1: 259, 277, 449--450, 472, & 475. 1934; Moldenke, Phytologia 1: 204. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Cit. 1: 44. 1946; Moldenke, Phytologia 2: 394 & 437, fig. 2. 1947; Moldenke, Alph. List Cit. 2: 331 & 347 (1948) and 3: 855. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Phytologia 4: 354. 1953; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

Illustrations: Moldenke, Phytologia 2: 437, fig. 2. 1948.

AEGIPHILA GOELDIANA Huber & Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 124. 1933; Moldenke, Brittonia 1: 255, 266, 322--323, & 473. 1934; Moldenke, Phytologia 1: 204--205. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Phytologia 1: 388. 1940; Moldenke, Known Geographic Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Cit. 1: 240, 274, & 322 (1946) and 2: 446. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 61. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA GOUDOTIANA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 124--125. 1933; Moldenke, Brittonia 1: 262, 263, 282--283, & 473. 1934; Moldenke, Phytologia 1: 205 & 224. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 1: 243. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 62. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58 & 175. 1949; Moldenke, Résumé 65 & 441. 1959.

I strongly suspect that this plant is a member of the genus Cordia, in the Ehretiaceae. The type should be re-examined.

AEGIPHILA GRANDIS Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 125. 1933; Moldenke, Brittonia 1: 263, 284--286, 290, 473, 475, & 476. 1934; Moldenke, Phytologia 1: 206, 207, & 224. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Prelim. Alph. List Invalid Names 2. 1940; Moldenke, Alph. List Invalid Names 2. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 1: 133, 243, & 326. 1946; Moldenke, Phytologia 2: 395 (1947) and 2: 436. 1948; Moldenke, Alph. List Cit. 2: 335, 337, & 352 (1948), 3: 694 & 758 (1949), and 4: 1005, 1006, 1066, 1068, 1069, & 1076. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58, 62, & 175. 1949; Moldenke, Phytologia 4: 354. 1953; Moldenke, Résumé 65, 69, 229, & 441. 1959.

This species has also been collected at altitudes of 2300 to

2500 meters.

Additional citations: VENEZUELA: Mérida: Bernardi 6157 (N).

AEGIPHILA GRAVEOLENS Mart. & Schau.

Additional & emended literature: Jacks., Ind. Kew. 1: 46. 1893; Moldenke, Brittonia 1: 254, 259, 265, 304—305, 312, 313, 472, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 24, 1939; Moldenke, Prelim. Alph. List Invalid Names 4. 1940; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Invalid Names 2 & 3. 1942; Moldenke, Alph. List Cit. 1: 43, 45, 78, 90, 230, & 231 (1946) and 2: 327, 343, 368, 369, 433, & 435. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 46. 1948; Moldenke, Alph. List Cit. 3: 675, 687, 709—711, 736, 855, 856, & 919—921. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Phytologia 4: 432. 1953; Moldenke, Résumé 86, 229, 231, & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA GUIANENSIS Moldenke

Additional literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 125—126. 1933; Moldenke, Geogr. Distrib. Avicenn. 18—20 & 24. 1939; Moldenke, Prelim. Alph. List Invalid Names 1. 1940; Moldenke, Alph. List Invalid Names 1. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 35, & 85. 1942; Moldenke, Alph. List Cit. 1: 326 (1946), 2: 337, 603, & 610 (1948), 3: 820, 905, & 956 (1949), and 4: 1006. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58, 62, 65, 74, & 175. 1949; Moldenke, Phytologia 4: 389—390 & 432. 1953; Moldenke, Résumé 65, 69, 74, 86, 228, & 441. 1959.

Collectors describe this as 1 meter tall or as a tree to 10 m. tall, with white or cream-colored flowers, the stamens long-exserted, blooming in June and August, common in the "mata" at 150 meters altitude, and called "buen cristiano".

Additional citations: VENEZUELA: Barinas: Aristeguieta 3272 (N). Carabobo: Aristeguieta 2798 (N). Guárico: Aristeguieta 4215 (Z). Mérida: Bernardi 3348 (N), 6495 (N).

AEGIPHILA HASSLERI Briq.

Additional & emended literature: Arech., Anal. Mus. Montev. 2: 280. 1899; Arech., Fl. Urug. 2: 108. 1903; J. A. Clark, Card Ind. Gray Herb. 1904; Moldenke, Brittonia 1: 255, 258, 259, 265, 306—310, 428, 457, 472, 473, & 475. 1934; Latzina, Trab. Inst. Bot. & Farm. Buenos Aires 54: 112. 1935; Chebataroff, Revist. Sudam. Bot. 5: 166, 167, & 170, fig. 2. 1938; Moldenke, Geogr. Distrib. Avicenn. 24, 28, & 29. 1939; Herter, Beih. Bot. Centralbl. 59: 275. 1939; Moldenke, Prelim. Alph. List Invalid Names 2. 1940; Moldenke, Alph. List Invalid Names 2. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 40—42, & 85. 1942; Moldenke, Alph. List Cit. 1: 11, 12, 27, 39, 50, 100, 171, 184, 197, 200, 201, 263, 264, 305, & 326 (1946), 2: 332, 337, 358, 377, 437, 442, 458, & 599. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Alph. List Cit. 3: 671, 692, 772, 863, 865, &

911 (1949) and 4: 1048, 1166, 1191, 1198, 1236, & 1294. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74, 98, 99, 102, & 175. 1949; Moldenke, Phytologia 4: 390. 1953; Moldenke, Résumé 86, 115, 118, 122, 212, 227, 229, & 441. 1959; Angely, Fl. Paran. 16: 36. 1960.

Illustrations: Chebataroff, Revist. Sudam. Bot. 5: 167, fig. 2. 1938.

Curran records the vernacular name "yacu" for this species.

Additional citations: BRAZIL: Rio Grande do Sul: Rau 16 [Herb. Jard. Bot. Rio Jan. 29515] (B). PARAGUAY: Hassler 3193 (N--cotype), 6780 (Ca--944318--cotype, N--cotype), 8632 (Ca--929823, N).

AEGIPHILA HASTINGSIANA Moldenke

Literature: Moldenke, Phytologia 1: 207--208. 1937; Moldenke, Geogr. Distrib. Avicenn. 14. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 85. 1942; Moldenke, Alph. List Cit. 1: 248. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 34 & 175. 1949; Moldenke, Résumé 41 & 441. 1959.

AEGIPHILA HAUGHTII Moldenke

Additional literature: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 34, & 85. 1942; Moldenke, Alph. List Cit. 1: 266. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Alph. List Cit. 3: 915 (1949) and 4: 1064. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69, 71, & 175. 1949; Moldenke, Phytologia 4: 391. 1953; Moldenke, Résumé 78, 81, & 441. 1959.

Additional citations: PERU: Loreto: J. M. Schunke 338 (N).

AEGIPHILA HERZOGII Moldenke

Additional & emended literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 126--127. 1933; Moldenke, Brittonia 1: 259, 279, 420--421, 423, 466, & 474. 1934; Moldenke, Phytologia 1: 199 & 224. 1937; Moldenke, Geogr. Distrib. Avicenn. 27. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 & 85. 1942; Moldenke, Alph. List Cit. 1: 326 (1946) and 2: 337 & 535. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 64. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 96 & 175. 1949; Moldenke, Alph. List Cit. 3: 692, 694, & 967. 1949; Moldenke, Phytologia 4: 391. 1953; Moldenke, Résumé 112 & 441. 1959.

AEGIPHILA HIRSUTA Moldenke

Additional & emended literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 127. 1933; Moldenke, Brittonia 1: 252, 276, 431, 440--442, & 472. 1934; Moldenke, Geogr. Distrib. Avicenn. 27. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 & 85. 1942; Moldenke, Alph. List Cit. 1: 76 (1946) and 4: 1060. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 96 & 175. 1949; Moldenke, Phytologia 4: 391. 1953; Moldenke, Résumé 112 & 441. 1959.

AEGIPHILA HIRSUTA var. COLOMBIANA Moldenke

Literature: Moldenke, Castanea 10: 44. 1945; Moldenke, Alph. List Cit. 1: 133. 1946; Moldenke, Phytologia 2: 396. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58 & 175. 1949; Moldenke, Alph. List Cit. 4: 1076. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA HIRSUTISSIMA Moldenke

Additional & emended literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 127--128. 1933; Moldenke, Brittonia 1: 270, 300, 405, 409--411, & 475. 1934; Moldenke, Geogr. Distrib. Avicenn. 18 & 19. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, & 85. 1942; Moldenke, Alph. List Cit. 2: 610 (1948), 3: 806 & 819 (1949), and 4: 1041 & 1074. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58, 62, & 175. 1949; Moldenke, Phytologia 4: 391. 1953; Moldenke, Résumé 65, 69, & 441. 1959.

AEGIPHILA HOEHNEI Moldenke

Additional literature: F. C. Hoehne, Resen. Hist. Secc. Bot. Inst. Biol. S. Paulo 153 & 157. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 85. 1942; Moldenke, Alph. List Cit. 1: 121 (1946) and 2: 369, 553, & 624. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 64. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Phytologia 4: 391 & 432. 1953; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

Rodrigues describes the fruit of this species as yellow. He found the plant in flower and fruit in February, growing as a vine in wet places at the margin of the "igarapé" of Taruma.

Additional citations: BRAZIL: Amazonas: W. Rodrigues 2 [Herb. Inst. Nac. Pesq. Amaz. 780] (Z).

AEGIPHILA HOEHNEI var. PUYENSIS Moldenke

Literature: Moldenke, Phytologia 2: 214 & 396. 1947; Moldenke, Alph. List Cit. 2: 352 (1948) and 3: 965. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 175. 1949; Moldenke, Résumé 78 & 441. 1959.

Asplund describes this plant as a shrub 2 meters tall, growing in forests at 900 meters altitude, in flower and fruit in February.

Additional citations: ECUADOR: Napo-Pastaza: Asplund 19426 (S).

AEGIPHILA HOEHNEI var. SPECTABILIS Moldenke

Literature: Moldenke, Castanea 10: 44--45. 1945; Moldenke, Phytologia 2: 396. 1947; Moldenke, Alph. List Cit. 2: 610. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58 & 175. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA INSIGNIS Moldenke

Literature: Moldenke, Brittonia 1: 188. 1932; J. A. Clark, Card Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 254, 278, 436--437, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Prelim. Alph. List Invalid Names 33. 1940; Moldenke, Known Geogr.

Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Invalid Names 34. 1942; Moldenke, Alph. List Cit. 2: 339 (1948), 3: 881 (1949), and 4: 983. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Phytologia 4: 391. 1953; Moldenke, Résumé 81, 329, & 441. 1959.

AEGIPHILA INTEGRIFOLIA (Jacq.) Jacks.

Additional synonymy: Aegiphila intermedia (Aubl.) Moldenke, Phytologia 4: 394, in obs. 1953 [not A. intermedia Moldenke, 1933]. Aegiphila integrifolia (Jacq.) Jack ex Rennó, Levant. Herb. Inst. Agron. Minas 149, sphalm. 1960.

Additional & emended literature: Jacks., Ind. Kew. 1: 46 & 386 (1893) and 2: 160. 1894; Moldenke, Brittonia 1: 252, 257, 258, 260, 267, 268, 316, 334, 337--342, 344, 348, 349, 364, 457, & 472--477. 1934; Moldenke, Geogr. Distrib. Avicenn. 12, 18--24, 27, & 35. 1939; Moldenke, Alph. List Common Names 4--8, 18, 30, & 33. 1939; Moldenke, Prelim. Alph. List Invalid Names 1, 10, 11, & 32. 1940; Moldenke in Pulle, Fl. Surin. 4 (2): 304. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32--35, 39, 70, & 85. 1942; Moldenke, Alph. List Invalid Names 1, 9, & 33. 1942; Moldenke, Alph. List Cit. 1: 7, 15, 27--29, 44, 50, 68, 70, 76, 78, 79, 92, 96, 117, 121, 131, 133, 134, 136, 142, 145, 163, 164, 167, 169, 179, 198, 204, 238, 239, 274, 286, 317--319, 321, & 323. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 321, 333--335, 348, 352, 392, 403, 412, 432, 435, 436, 446, 529, 535, 553, 557, 572, 573, 579, 582, 610--612, 615, 616, 630, 638, & 643 (1948), 3: 668, 686, 701, 717, 728, 731, 802, 805, 808, 820, 823, 844, 881, 884, 893, 905, 915, 955--957, 967, 968, & 974 (1949), and 4: 982, 984, 988, 1005--1010, 1015, 1018, 1020, 1035, 1040, 1043, 1048, 1050, 1052, 1058, 1060, 1062--1064, 1066, 1067, 1071, 1076, 1079, 1080, 1082, 1097, 1117, 1130, 1132, & 1135. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 56, 58, 62, 65, 68, 69, 71, 74, 96, 156, & 175. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Phytologia 4: 391--392. 1953; Mendes Megalhães, Bol. Soc. Portug. Cienc. Nat., ser. 2, 5: 111. 1955; Moldenke, Mem. N. Y. Bot. Gard. 9: 175. 1955; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 405--407. 1955; Moldenke, Fam. 2 Verbenac. 24--26. 1955; Moldenke, Résumé 62, 65, 69, 74, 77, 78, 81, 86, 112, 212, 228, 229, 232, 242, 243, 319, & 441. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 149. 1960; A. R. Schulz, Inst. Tec. Rio Grande do Sul Pub. 30: 15. 1960.

Stern, Chambers, Dwyer, & Ebinger describe this plant as a small tree 20 feet tall, with the stem 2 inches in diameter at breast height, the wood light in weight, the stems square, and the flowers white, in June. Allen describes it as a small tree, 8 feet tall, or a bush; Williams reports that the trunk may be 40 cm. wide, while Schunke says the stem is only 10 cm. in circumference. Castañeda describes the fruit as woody and red, in September. The species has been found in "capeira" and on rising ground, at altitudes of 130 to 2100 meters. The Ll. Williams 2052 specimen in the Britton Herbarium, previously regarded by me as

representing this species, is actually A. amazonica Moldenke. The leaves of A. integrifolia are said by some collectors to possess an offensive odor. Schulz (1960) records the common name "botim" and says that in his opinion A. australis Moldenke may be conspecific with this taxon.

Additional citations: PANAMA: Darien: Stern, Chambers, Dwyer, & Ebinger 663 (Bm). COLOMBIA: Magdalena: C. Allen 407 (E--1014194), 411 (E--1014196). Santander: Castañeda 4871 (W--2199276). Department undetermined: Triana 375 (N). VENEZUELA: Amazonas: Schultes & López 9260 (Be--52642); Wurdack & Adderley 42905 (N, S). Bolívar: Ll. Williams 13401 (Ca--734056). Zulia: H. Pittier 10626 (Vi). BRITISH GUIANA: Herb. Forest Dept. Br. Guian. 7912 [R.B. 88] (N). ECUADOR: Napo-Pastaza: Harling 3519 (S). PERU: Loreto: Schunke 343 (Ca--659760, Ss). BRAZIL: Pará: Frões & Filho 29477 (Be--79015); Murça Pires 4531 (Z). Rio Branco: G. A. Black 51-13987 (Be--72206). BOLIVIA: Cochabamba: Diers 880 (Ko). Department undetermined: Troll 1704 [Pajonales] (B).

AEGIPHILA INTERMEDIA Moldenke

Additional literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 128. 1933; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32, 35, & 85. 1942; Moldenke, Alph. List Cit. 1: 167, 169, & 240 (1946), 2: 337, 343, 354, 439, 444, 485, & 571 (1948), 3: 694 (1949), and 4: 1042, 1072, 1077, & 1132. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62, 74, & 175. 1949; Moldenke, Phytologia 4: 394 & 431. 1953; Moldenke, Résumé 65, 69, 86, & 441. 1959; Angely, Ind. Ang. 10. 1959.

The "Aegiphila intermedia (Aubl.) Moldenke" referred to in Phytologia 4: 394 (1953) and in Résumé 229 (1959) belongs in the synonymy of A. integrifolia (Jacq.) Jacks.

Collectors describe this plant as a shrub, 3 m. tall, or a tree, 10 m. tall, with a trunk 15 cm. in diameter, and the flowers white, yellowish-white, or yellow. Schultes & Cabrera report the plant growing as a "weed" in cultivated fields, 3--4 feet tall, with whitish-yellow flowers and orange fruit. It has been collected in anthesis in September and December, and in fruit in September. It has been found in "capoeira", on "terra firma", and in wet sandy humid "terra firma". An additional vernacular name is "ya-mwo-nó". It has been misidentified in herbaria as A. salticola Moldenke.

Additional citations: COLOMBIA: Vaupés: Schultes & Cabrera 17200 (Z), 17326 (Ss). BRAZIL: Amazonas: Chagas s.n. [Herb. Inst. Nac. Pesq. Amaz. 415] (Ok), s.n. [Herb. Inst. Nac. Pesq. Amaz. 4487] (Ok); Dionisio s.n. [Herb. Inst. Nac. Pesq. Amaz. 3828] (Ok); Dionisio & Chagas s.n. [Herb. Inst. Nac. Pesq. Amaz. 3269] (Ok); Francisco & Dionisio s.n. [Herb. Inst. Nac. Pesq. Amaz. 3179] (Ok).

AEGIPHILA KILLIPII Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 128--129. 1933; Moldenke, Brittonia 1: 259, 271, 402--403, & 474. 1934; Moldenke, Phytologia 1: 228 (1937) and 1: 292. 1938; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Prelim. Alph. List Invalid Names 2. 1940; Moldenke, Phytologia 1: 390. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Invalid Names 2. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 66. 1948; Moldenke, Alph. List Cit. 2: 611 (1948) and 4: 1060. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58 & 175. 1949; Moldenke, Résumé 65, 229, & 441. 1959.

AEGIPHILA LAETA H.B.K.

Additional & emended literature: Moldenke, Brittonia 1: 258, 266, 352--353, 391, 394, 395, & 474--476. 1934; Moldenke, Alph. List Common Names 27. 1939; Moldenke, Geogr. Distrib. Avicenn. 18 & 19. 1939; Moldenke, Prelim. Alph. List Invalid Names 2 & 4. 1940; Moldenke, Alph. List Invalid Names 2 & 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23, 30, 32, & 85. 1942; Moldenke, Alph. List Cit. 1: 7, 50, 142, 169, 265, 272, & 302 (1946), 2: 333, 345, 347, 349, 503, & 610 (1948), 3: 740, 806, 822, 827, 888, & 947 (1949), and 4: 1060, 1073, 1120, & 1170. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 40, 41, 58, 62, & 175. 1949; Moldenke, Phytologia 4: 394 & 428. 1953; Moldenke, Résumé 47, 49, 65, 69, 229, 231, & 441. 1959.

Johnston describes this plant as 5--7 feet tall, with greenish-yellow corollas and orange fruits in October, growing in thickets. Allen describes the flowers as cream-yellow and the fruits as "berries". They are, however, true drupes. The species was found by him in the semi-shade of forests, in fruit in August. It has been misidentified in herbaria as "Callicarpa sp." and as "Ehretia sp."

Additional citations: PEARL ISLANDS: San José: I. M. Johnston 56 (W--2023905). COLOMBIA: Magdalena: C. Allen 416 (E--1015201), 501 (E--1015239). VENEZUELA: Zulia: Mocquerys 1018 (N); H. Pittier 10533 (Vi).

AEGIPHILA LAEVIS (Aubl.) Gmel.

Additional synonymy: Aegiphila laevis (Aubl.) Gmel. ex Moldenke, Alph. List Cit. 4: 1079, sphalm. 1949.

Additional & emended literature: Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 256. 1857; Jacks., Ind. Kew. 1: 46 (1893) and 2: 160. 1894; Moldenke, Brittonia 1: 260, 269, 307, 391, 394--397, 416, 426, 464--467, 472, & 474--477. 1934; Moldenke, Geogr. Distrib. Avicenn. 18, 20, & 21. 1939; Moldenke, Alph. List Common Names 13 & 20. 1939; Moldenke, Prelim. Alph. List Invalid Names 2, 3, & 32. 1940; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Alph. List Invalid Names 2, 3, & 33. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 36, & 85. 1942; Moldenke, Alph. List Cit. 1: 15, 40, 44, 112, 116, 121, 134, 195, 217, 284, 321, & 326. 1946; Moldenke,

Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 434, 552, 567, 603, 604, & 640 (1948), 3: 655, 702, 709, 725, 806, 810, 825, 853, 855, 888, 892, 920--922, & 951 (1949), and 4: 984, 1039, 1079, 1097, 1146, 1147, & 1214. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 58, 65, 67, 68, 74, & 175. 1949; Moldenke, Phytologia 4: 394--395. 1953; Moldenke, Résumé 65, 74, 76, 77, 86, 229--231, 319, & 441. 1959.

N. E. Brown, in a letter to H. A. Gleason, dated March 28, 1931, says "At last I am able to answer your query about Manabea laevis, Aubl. I was not able to go to the British Museum until two days ago, when I carefully examined the type of that plant and find that (as I expected) the leaves are exactly in size and shape as represented by Aublet on t. 25, but that the drawing was probably made from a different specimen than the two that constitute the type at the Brit. Mus. Because one of those specimens has a terminal inflorescence only, while the other has only one cyme, and that is axillary. Otherwise the figure represents the type correctly. I think the cymes of the two specimens represent different sexes, but of this I cannot be sure without dissection, which I had not time for. But in my opinion Manabea laevis is specifically perfectly distinct from the West Indian Aegiphila elata as generally understood, for the type is not at the Brit. Mus. The shape of the leaves of Manabea laevis and their venation (the venation is much stronger and more prominent in M. laevis than in the West Indian Ae. elata) being quite different from the leaves of the West Indian plant. The flowers of the two I could not properly compare as I had not time to dissect them."

Schultes & Cabrera describe the plant as a bush with yellowish flowers. Black & Lobato found it growing in "capoeira".

Additional citations: COLOMBIA: Putumayo: Schultes & Cabrera 18971 (W--2113115). BRAZIL: Amapá: Black & Lobato 50-9605 (Z).

AEGIPHILA LANATA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 129. 1933; Moldenke, Brittonia 1: 259, 267, 330, 345--346, & 473. 1934; Moldenke, Phytologia 1: 230. 1937; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Phytologia 1: 391. 1940; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Invalid Names 2. 1942; Moldenke, Alph. List Cit. 1: 238. 1946; Moldenke, Phytologia 2: 399 (1947) and 2: 436. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 46. 1948; Moldenke, Alph. List Cit. 2: 337 (1948), 3: 694 (1949), and 4: 1046. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Résumé 86, 229, & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA LANCEOLATA Moldenke

Additional & emended literature: Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 318. 1904; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 546. 1911; Prain, Ind. Kew. Suppl. 5: 6. 1921; Moldenke in Fedde, Repert. Sp. Nov. 33: 129--130. 1933; Moldenke, Brittonia

1: 253, 279, 321, 423--425, 428, 430, & 472--475. 1934; Moldenke, *Phytologia* 1: 296. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 24, 28, & 35. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 1. 1940; Moldenke, *Alph. List Invalid Names* 1. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 36, 40, 70, & 85. 1942; Moldenke, *Alph. List Cit.* 1: 21, 27, 78, 79, 106, 201, 237, & 323 (1946), 2: 341, 361, 368, & 552 (1948), 3: 658 & 670 (1949), and 4: 1048. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74, 156, & 175. 1949; Moldenke, *Résumé* 86, 115, 212, 228, & 441. 1959; Angely, *Ind. Ang.* 10. 1959; J. A. Clark, *Card Ind. Gray Herb.* n.d.

The *Silva* 399 so determined in the University of California herbarium at Berkeley is not verbenaceous, but the same number in the Britton Herbarium is *A. lanceolata*. Apparently there is a mixup in labels in one place or the other.

Additional citations: BRAZIL: Minas Gerais: Macedo 2055 (S).

AEGIPHILA LAXICUPULIS Moldenke

Additional & emended literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 130--131. 1933; Moldenke, *Brittonia* 1: 257, 273, 397--399, 472, 474, & 475. 1934; Moldenke, *Geogr. Distrib. Avicenn.* 14 & 16. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 2. 1940; Moldenke, *Suppl. List Invalid Names* 1. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 19, 21, 22, & 85. 1942; Moldenke, *Alph. List Invalid Names* 2. 1942; Moldenke, *Alph. List Cit.* 1: 39, 88, & 326 (1946), 2: 345, 435, & 536 (1948), 3: 784, 877, & 940 (1949), and 4: 1022, 1023, 1048, 1051, & 1058. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 34, 37, 38, & 175. 1949; Moldenke, *Phytologia* 4: 396. 1953; Moldenke, *Résumé* 41, 45, 229, & 441. 1959.

AEGIPHILA LAXIFLORA Benth.

Additional & emended literature: J. A. Clark, *Card Ind. Gray Herb.* 1923; Moldenke, *Brittonia* 1: 252, 273, 389--391, 393, 395--397, 400, & 472--476. 1934; Moldenke, *Geogr. Distrib. Avicenn.* 12, 19, & 20. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 2 & 4. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 30, 32, 33, & 85. 1942; Moldenke, *Alph. List Invalid Names* 2 & 3. 1942; Moldenke, *Alph. List Cit.* 1: 68, 70, 131, 142, 201, 272, 316, & 317 (1946), 2: 331, 333, 337, 341, 352, & 593 (1948), 3: 669, 694, 783, 857, 905, 975, & 976 (1949), and 4: 1006--1009, 1035, 1043, & 1058. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 56, 62, 65, & 175. 1949; Moldenke, *Phytologia* 4: 396. 1953; Moldenke, *Résumé* 62, 70, 74, 229, 231, & 441. 1959.

AEGIPHILA LEHMANNII Moldenke

Additional literature: Moldenke, *Geogr. Distrib. Avicenn.* 18. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 30 & 85. 1942; H. N. & A. L. Moldenke, *Pl. Life* 2: 68. 1948; Moldenke, *Alph. List Cit.* 2: 334, 337, 636, & 643 (1948), 3: 694 & 950 (1949), and 4: 1006. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 58 & 175. 1949; Moldenke, *Phytologia* 4: 396.

1953; Moldenke, *Résumé* 65 & 441. 1959.

Additional citations: COLOMBIA: Boyacá: Lawrance 156 (Ca--76131). Cauca: Sneider 1660 (N).

AEGIPHILA LEWISIANA Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 131--132. 1933; Moldenke, *Brittonia* 1: 258, 270, 400--402, & 473. 1934; Moldenke, *Phytologia* 1: 231--232. 1937; Moldenke, *Geogr. Distrib. Avicenn.* 19. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 32 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 198. 1946; H. N. & A. L. Moldenke, *Pl. Life* 2: 69. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 62 & 175. 1949; Moldenke, *Résumé* 70 & 441. 1959.

AEGIPHILA LHOTZKIANA Cham.

Additional synonymy: Aegiphila lhotskiana Cham. & L. ex Moldenke, *Résumé* 229, in syn. 1959.

Additional & emended literature: Moldenke, *Brittonia* 1: 252, 267, 268, 323--324, 326, 328, 330, & 472--477. 1934; Moldenke, *Geogr. Distrib. Avicenn.* 24. 1939; Moldenke, *Prelim. Alph. List Invalid Names* 2, 4, & 50. 1940; Moldenke, *Suppl. List Invalid Names* 1. 1941; Moldenke, *Alph. List Invalid Names* 2, 3, & 53. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 36 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 43--45, 56, 78, 94, 106, 107, 121, 170, 172, 212, 239, 276, 286, 289, 290, & 298. 1946; H. N. & A. L. Moldenke, *Pl. Life* 2: 69. 1948; Moldenke, *Alph. List Cit.* 2: 328, 329, 331, 337, 345, 346, 350, 361, 362, 365, 402, 433, 434, 446, 486, 491, 530, 533, 534, 552, & 598 (1948), 3: 658, 669, 675, 676, 690, 692, 707, 711, 725, 726, 749, 770, 823, 845, 890, 891, & 921--923 (1949), and 4: 1014, 1022, 1060, 1081, 1106, 1124, & 1152. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 74 & 175. 1949; Moldenke, *Phytologia* 4: 396--397. 1953; Moldenke, *Résumé* 86, 229--231, 383, & 441. 1959; Angely, *Ind. Ang.* 10. 1959; Rennó, *Levant. Herb. Inst. Agron. Minas* 149. 1960; Angely, *Fl. Paran.* 16: 36. 1960.

Fróes describes this plant as a tree, 2 meters tall, with yellow flowers, blooming in October.

Additional citations: BRAZIL: Bahia: Glocker 540-19E (N). Minas Gerais: Macedo 2032 (S). Pará: Fróes 30590 (N). Paraná: Hatschbach 5114 (Z).

AEGIPHILA LONGIFOLIA Turcz.

Additional & emended literature: Jacks., *Ind. Kew.* 1: 46. 1893; Moldenke, *Brittonia* 1: 271, 371--374, 395, 447, 473, & 476. 1934; Moldenke, *Geogr. Distrib. Avicenn.* 18. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 30 & 85. 1942; Moldenke, *Alph. List Cit.* 1: 132 & 193 (1946), 2: 332 & 337 (1948), and 3: 692 & 903. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 58 & 175. 1949; Moldenke, *Phytologia* 4: 397. 1953; Moldenke, *Résumé* 65, 86, & 441. 1959.

AEGIPHILA LONGIPETIOLATA Moldenke

Literature: Hayek in Engl., Bot. Jahrb. 42: 171—172. 1909; J. A. Clark, Card Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 188 (1932) and 1: 275, 384, 417—418, 426, & 477. 1934; Moldenke, Phytologia 1: 233. 1937; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Phytologia 1: 392. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85 (1942) and [ed. 2], 71 & 175. 1949; Moldenke, Alph. List Cit. 4: 1113. 1949; Moldenke, Résumé 81 & 441. 1959.

AEGIPHILA LUSCHNATHI Schau.

Additional & emended literature: Moldenke, Brittonia 1: 259, 265, 306—308, 396, & 472—477. 1934; Moldenke, Geogr. Distrib. Avicenn. 24 & 35. 1939; Moldenke, Prelim. Alph. List Invalid Names 2. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 70, & 85. 1942; Moldenke, Alph. List Invalid Names 2. 1942; Moldenke, Alph. List Cit. 1: 30, 40, 44, 78, 90, 106, 212, 223, 226, 236—238, 250, & 327. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; H. N. & A. L. Moldenke, Fl. Life 2: 70. 1948; Moldenke, Alph. List Cit. 2: 331, 332, 361, 365, 413, 416, & 528 (1948), 3: 676, 684, 687, 710, 736, 737, 824, 837, 838, 844, 856, & 890 (1949), and 4: 1014, 1123, & 1232. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74, 156, & 175. 1949; Moldenke, Phytologia 4: 397—398. 1953; Moldenke, Résumé 86, 212, 230, & 441. 1959.

AEGIPHILA MACRANTHA Ducke

Additional synonymy: Aegiphila macrabtha Ducke ex Moldenke, Alph. List Cit. 2: 402, sphalm. 1948.

Additional & emended literature: Moldenke, Brittonia 1: 254, 258, 265, 319—322, 436, 473, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 12, 20, 21, & 24. 1939; Moldenke, Prelim. Alph. List Invalid Names 19 & 22. 1940; Moldenke, Alph. List Invalid Names 16 & 21. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 33, 36, & 85. 1942; Moldenke, Alph. List Cit. 1: 156 & 168 (1946), 2: 353, 402, & 445 (1948), 3: 724, 725, 823, 894, 905, & 906 (1949), and 4: 1007, 1052, 1062, 1065, 1097, & 1222. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 56, 65, 68, 74, & 175. 1949; Moldenke, Phytologia 4: 398. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 405 & 406. 1955; Moldenke, Fam. 2 Verbenac. 24 & 25. 1955; Moldenke, Résumé 62, 70, 74, 77, 86, 261, 272, & 441. 1959; Angely, Ind. Ang. 10. 1959.

The species is said to be a woody vine sometimes more than 30 meters tall, found at altitudes from 100 to 1400 meters, sometimes along quebradas, fruiting in January and May. Steyermark describes the leaves as rich-green above, with sulcate nerves, pale-green beneath, with elevated nerves. The fruiting-calyx is very heavy, about 2.5 cm. long, 3.8—4 cm. wide, verruculose. The fruit is spherical or subglobose to broadly oblong, brown, 2.5—3.5 cm. long, 2.5—3 cm. wide.

Additional citations: VENEZUELA: Bolívar: Steyermark 75384 (Ss). BRITISH GUIANA: Schomburgk 873 (Bm). BRAZIL: Amazonas:

Murça Pires 517 (Be--284750). Pará: Black & Foster 48-3402 (Ca--799733); Murça Pires 4663 (N, Z), 4746 (Ok, Ss).

AEGIPHILA MACROPHYLLA H.B.K.

Literature: H.B.K., Nov. Gen. & Sp. Pl. 2: 251. 1818; Roem. & Schult., Syst. Veg. 3: 103. 1818; Steud., Nom. Bot., ed. 1, 1: 16. 1821; Kunth, Syn. Pl. 2: 44. 1823; Spreng. in L., Syst. Veg., ed. 16, 1: 420. 1825; Schlecht. & Cham., Linnaea 6: 371. 1831; Cham., Linnaea 7: 110. 1832; Dietr., Syn. Pl. 1: 430. 1839; Steud., Nom. Bot., ed. 2, 1: 29. 1840; Walp., Repert. 4: 120 & 122. 1845; Schau. in A. DC., Prodr. 11: 653--654. 1847; Sagra, Hist. Cuba 11: 146. 1850; Jacks., Ind. Kew. 1: 46. 1893; Moldenke, Brittonia 1: 380, 470--471. 1934; Moldenke, Phytologia 1: 234. 1937; Moldenke, Geogr. Distrib. Avicenn. 19. 1939; Moldenke, Prelim. Alph. List Invalid Names 2, 3, & 25. 1940; Moldenke, Phytologia 1: 392. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 85. 1942; Moldenke, Alph. List Invalid Names 2 & 24. 1942; Moldenke, Alph. List Cit. 2: 529 & 573. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62 & 175. 1949; Moldenke, Résumé 70, 229, 230, 284, & 441. 1959.

AEGIPHILA MAGNIFICA Moldenke

Additional & emended literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 132. 1933; Moldenke, Brittonia 1: 274, 385--386, 472, 475, & 476. 1934; Standl., Field Mus. Publ. Bot. 18: 996. 1938; Moldenke, Geogr. Distrib. Avicenn. 16 & 17. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19, 22, 23, & 85. 1942; Moldenke, Alph. List Cit. 1: 24 (1946), 2: 348, 390, 469, 479, & 500 (1948), 3: 780, 918, 959, 961, & 962 (1949), and 4: 1000, 1040, 1053, & 1227. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 34, 38, 40, & 175. 1949; Moldenke, Phytologia 4: 398. 1953; Moldenke, Résumé 41, 45--47, & 441. 1959.

AEGIPHILA MAGNIFICA var. PUBESCENS Moldenke

Additional literature: Moldenke, Phytologia 4: 398. 1953; Moldenke, Résumé 46 & 441. 1959.

Additional citations: COSTA RICA: San José: Skutch 4139 (N--isotype, S--isotype).

AEGIPHILA MARTINICENSIS Jacq.

Additional synonymy: Aegiphila minima W. Wright ex Moldenke, Phytologia 1: 235, in syn. 1937. Aegiphila pyramidata L. ex Moldenke, Prelim. Alph. List Invalid Names 3, in syn. 1940. Aegiphila maderiensis Hort. ex Moldenke, Résumé 230, in syn. 1959. Aegiphila maryinicensis Jacq. ex Moldenke, Alph. List Cit. 1: 156, sphalm. 1946.

Additional & emended literature: Griseb., Abhand. Königl. Gesell. Wissen. Götting. 7: 257. 1857; Moldenke, Brittonia 1: 252--254, 257--260, 270, 274, 364, 371, 376--384, 387, 393, 395, 396, 401, 416, 465, & 472--477. 1934; Moldenke, Geogr. Distrib. Avicenn. 4, 6--12, 17--19, 21, & 35. 1939; Moldenke, Alph. List

Common Names 4, 5, 7, 19, 21, 28, & 33. 1939; Moldenke in Pulle, Fl. Surin. 4 (2): 304. 1940; Moldenke, Prelim. Alph. List Invalid Names 1--4 & 39. 1940; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Alph. List Invalid Names 1--3 & 39. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23--25, 27--30, 32, 33, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 9, 16, 21, 34, 36, 37, 39, 48, 57, 62--64, 67, 70, 74, 89, 114, 117, 122, 123, 133, 156, 167, 172, 173, 179--181, 207, 208, 217, 248, 249, 252, 254, 269, 270, 272, 274, 281, 282, 301, 302, 305, 308, 313, & 320. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 331, 336, 352, 358, 359, 403, 408, 409, 433, 434, 459, 482, 503, 504, 528, 531, 543, 554, 560, 564--566, 576, 577, 579, 593, 618, 620, 621, 631, & 640 (1948), 3: 740, 757, 771, 774, 780, 782, 805, 810, 813, 820, 822, 826, 835, 839, 842, 853, 854, 856, 871, 887, 894, 927, 928, 934, 935, 937, 938, 946, 949, 957, 958, 965, & 971 (1949), and 4: 982, 988, 994, 1001, 1009, 1016, 1022, 1026, 1027, 1030, 1032, 1034, 1039, 1044, 1050, 1052, 1058, 1065, 1066, 1078, 1082, 1097, 1103, 1105, 1117, 1145, 1146, & 1209. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 40, 42, 46, 49--56, 58, 62, 68, 156, & 175. 1949; Moldenke, Phytologia 4: 398--400. 1953; Roig, Dicc. Bot. 2: 575--576 & 976. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 406 & 409. 1955; Moldenke, Fam. 2 Verbenac. 25 & 28. 1955; Alain in León & Alain, Fl. Cuba 4: 309 & 310. 1957; Moldenke, Résumé 47, 50, 54, 58--62, 65, 70, 78, 212, 228--232, 341, 414, & 441. 1959; Angely, Ind. Ang. 10. 1959.

The corolla of this species is described by collectors as yellow or greenish-yellow, and the filaments as greenish-yellow or white. It has been found in anthesis in May and September, and in fruit in May. Smith calls it a scrambling shrub or liana, with the young fruits pale-yellow, growing at the forest-edge, in both flower and fruit in March. Morton found it at altitudes of 300 to 750 meters. Beard encountered it in waste lands and in secondary bush land. Cowan describes it as occasional in primary forests and refers to it as a scrambling shrub with orange fruit in April.

According to Roig, the name "lengua de vaca" is applied also to Sansevieria guineensis (Jacq.) Willd. in the Agavaceae and to Ixora floribunda (A. Rich.) Griseb. in the Rubiaceae. The Arsène specimen cited below bears a printed label reading "Pl. du Mexique", but the specimen was collected at Rio Piedras in Puerto Rico, so the label is obviously erroneous. One of the sheets of Hahn 491, cited by me previously as being in the Paris herbarium, is now at Berlin.

Additional citations: PUERTO RICO: Arsène & al. s.n. [Rio Piedras, Dec. 1913] (B). LEeward ISLANDS: Dominica: A. C. Smith 10236 (N, S, Sm), 10298 (N, S, Z). Guadeloupe: A. C. Smith 10376 (N, Sm). WINDWARD ISLANDS: Grenada: P. Beard 1243 (N). Martinique: Hahn 125 (B), 491 (B). St. Lucia: J. S. Beard 165 (N); R. S. Cowan 1554 (S). St. Vincent: P. Beard 1348 (N); Morton 3993 (W--1884730), 4687 (W--1883853), 4873 (W--1884023), 5716 (W--

1884566), 5720 (W—1884569, W—1884570), 5956 (W—1884709), 5957 (W—1884710), 6079 (W—2114971).

AEGIPHILA MARTINICENSIS var. *OLIGONEURA* (Urb.) Moldenke

Additional literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 132. 1933; Moldenke, Geogr. Distrib. Avicenn. 6, 7, 9—11, & 35. 1939; Moldenke, Alph. List Common Names 5. 1939; Moldenke, Prelim. Alph. List Invalid Names 3. 1940; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25, 27—29, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 102, 179, 180, 252, & 258 (1946), 2: 593 (1948), 3: 668, 928, & 949 (1949), and 4: 1020, 1034, 1048, & 1058. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46, 49, 52—55, 156, & 175. 1949; Moldenke, Phytologia 4: 400. 1953; Moldenke, Résumé 54, 58, 60, 61, 212, 230, & 441. 1959.

Morton describes this plant as a small tree, with orange fruit in May.

Additional citations: WINDWARD ISLANDS: St. Vincent: Morton 5586 (W—1884447), 5666 (W—1884522).

AEGIPHILA MEDITERRANEA Vell.

Additional & emended literature: Moldenke, Brittonia 1: 252, 266, 307, 309, 331—332, 472, 473, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 24 & 35. 1939; Moldenke, Prelim. Alph. List Invalid Names 1 & 2. 1940; Moldenke, Alph. List Invalid Names 1 & 2. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 42, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 51, 90, 222, 236, & 237 (1946), 2: 348, 361, 363, 389, 433, & 445 (1948), 3: 662, 696, 709, 736, 854—856, 863, 865, 890, 900, 907, & 920 (1949), and 4: 1014, 1087, 1093, 1123, 1124, & 1137. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74, 102, 156, & 175. 1949; Moldenke, Phytologia 4: 401. 1953; Moldenke, Résumé 86, 122, 212, 228—230, & 441. 1959; Angely, Ind. Ang. 10. 1959.

Additional citations: BRAZIL: Rio de Janeiro: A. Lutz 1046 (Lz).

AEGIPHILA MEDULLOSA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 264, 297, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 24. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 2: 348 (1948) and 3: 856, 889, & 890. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Phytologia 4: 401. 1953; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA MEMBRANACEA Turcz.

Additional synonymy: Aegiphylla membranacea Turcz. ex Moldenke, Résumé 232, in syn. 1959.

Additional & emended literature: Moldenke, Brittonia 1: 253, 270, 370—371, 374, 395, & 474—477. 1934; Moldenke, Geogr. Distrib. Avicenn. 18, 19, 21, & 23. 1939; Moldenke, Known Geogr.

Distrib. Verbenac., [ed. 1], 30, 32--34, & 85. 1942; Moldenke, Alph. List Cit. 1: 37, 318, 325, & 326. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 43. 1948; Moldenke, Alph. List Cit. 2: 331, 337, 352, 434, 567, 580, 581, & 603 (1948), 3: 692, 724, 725, 888, & 974 (1949), and 4: 988, 1005, 1006, 1032, 1046, 1097, 1098, & 1131. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, 67, 68, 71, & 175. 1949; Moldenke, Phytologia 4: 401--402 & 432. 1953; Moldenke, Résumé 65, 70, 76, 78, 81, 86, 232, & 441. 1959.

Recent collectors describe this plant as an erect shrub 2--3 meters tall or a tree 7 meters tall, with a trunk 7 cm. in diameter, the flowers white, blooming in February and December, fruiting in February. It is said to grow in forests, "mata baixa", and "mata de terra firme", at altitudes up to 1800 meters. The vernacular name "uvito" is recorded by Bernardi.

The definitions of the terms "membranous" and "chartaceous" given by me in Brittonia 1: 371 (1934) are reversed. I used them in this sense only up to the year 1934; since then I have used them consistently in exactly the reverse sense.

Additional citations: VENEZUELA: Mérida: Bernardi 2055 (N, N). SURINAM: Lanjouw & Lindeman 2085 (N). BRAZIL: Guaporé: J. F. Silva 304 (Be--77933). Pará: Murça Pires 3610 (Ss, Z), 3654 (Hk), 3825 (Be--71678).

AEGIPHILA MOLLIS H.B.K.

Additional synonymy: Aegiphila millis H.B.K. ex Moldenke, Alph. List Cit. 4: 1073, sphalm. 1949.

Additional & emended literature: Moldenke, Brittonia 1: 254, 259, 271, 403--406, 408, 411--413, 446, & 472--477. 1934; Moldenke, Alph. List Common Names 9, 15, & 30. 1939; Moldenke, Geogr. Distrib. Avicenn. 17--19. 1939; Moldenke, Prelim. Alph. List Invalid Names 3 & 24. 1940; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Alph. List Invalid Names 2, 3, & 22. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23, 30, 32, & 85. 1942; Moldenke, Alph. List Cit. 1: 9--12, 50, 98, 99, 132--134, 142, 164, 169, 180, 198, 217, 222, 230, 242, 243, 248, 262, 266, 271, 272, 275, 302, 303, 319, 320, & 326. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 46. 1948; Moldenke, Alph. List Cit. 2: 328, 331, 333, 336, 345, 347, 349, 503, 529, 573, 581, 603, 642, & 643 (1948), 3: 690, 749, 758, 783, 817, 819, 833, 888, 947, & 974 (1949), and 4: 1005, 1006, 1030, 1033, 1041, 1043, 1044, 1052, 1059, 1062, 1066, 1069, 1073, 1075--1078, 1080, 1096, 1141, & 1247. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 40, 59, 62, & 175. 1949; Moldenke, Phytologia 4: 402--403. 1953; Moldenke, Résumé 47, 65, 70, 230, 231, 276, & 441. 1959.

Recent collectors describe this plant as an herb, small shrub, shrub 3--6 feet tall, or even a small tree 3--5 meters tall and 15 cm. in diameter at the base, sometimes with a scrambling tendency. The leaves are said to be dark-green when fresh, and the flowers light- or pale-yellow, not odorous, with prominent anthers. The plant has been found in the semi-shade of forests and in

gullies, from 200 to 1250 meters altitude, blooming also in May.

Additional citations: PANAMA: Chiriquí: M. E. Davidson 638 (W-1820688). COLOMBIA: Magdalena: C. Allen 728 (E-1015227); Haught 3738 (N). VENEZUELA: Federal District: H. Pittier 7855 (Ca-923550, Mi).

AEGIPHILA MOLLIS var. INTERMEDIA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 133. 1933; Moldenke, Brittonia 1: 247, 272, 405, 406, 474, & 476. 1934; Moldenke, Phytologia 1: 240. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 46 & 85. 1942; Moldenke, Alph. List Cit. 1: 169, 190, 271, & 302 (1946) and 2: 340, 345, 503, & 610. 1948; Phytologia 2: 444-445. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Alph. List Cit. 3: 947 (1949) and 4: 1060 & 1062. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA MONSTROSA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 247, 251, 252, 254, 265, 298-299, 301, 472, & 474-476. 1934; Moldenke, Geogr. Distrib. Avicenn. 15 & 16. 1939; Moldenke, Alph. List Common Names 31. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 19, 20, & 85. 1942; Moldenke, Alph. List Cit. 1: 32, 33, 93, 122, 178, 207, 231, & 319-321 (1946), 2: 327-330, 334-336, 343, 346, 348, 349, 351, 503, & 588 (1948), 3: 676, 757, 842, 902, 939, 959-961, & 973 (1949), and 4: 1026, 1045, 1047-1049, 1055, 1058, 1061, 1066, 1097, 1131, & 1138. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28, 34, 36, 37, & 175. 1949; Moldenke, Phytologia 4: 403. 1953; Moldenke, Résumé 33, 41, 43, 44, & 441. 1959.

AEGIPHILA MONTANA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 133. 1933; Moldenke, Brittonia 1: 259, 271, 408-409, 413, & 475. 1934; Moldenke, Phytologia 1: 248. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85 (1942) and [ed. 2], 59 & 175. 1949; Moldenke, Alph. List Cit. 3: 885. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA MONTICOLA Moldenke

Additional literature: Moldenke in Fedde, Repert. Sp. Nov. 37: 210-211. 1934; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 85. 1942; Moldenke, Alph. List Cit. 2: 329 & 334 (1948) and 3: 757, 857, & 901. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 175. 1949; Moldenke, Phytologia 4: 403 & 433. 1953; Moldenke, Résumé 78 & 441. 1959.

AEGIPHILA MORTONI Moldenke

Literature: Moldenke, Phytologia 1: 249-250 (1937) and 1: 293. 1938; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph.

List Cit. 1: 122. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 73. 1948; Moldenke, Alph. List Cit. 4: 1032. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Résumé 81 & 441. 1959.

AEGIPHILA MULTIFLORA Ruiz & Pav.

Additional & emended literature: Moldenke, Brittonia 1: 255, 259, 295--297, 264, 330, 444, & 475--477. 1934; Moldenke, Alph. List Common Names 31. 1939; Moldenke, Geogr. Distrib. Avicenn. 23 & 27. 1939; Moldenke, Alph. List Invalid Names 16. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 39, & 85. 1942; Moldenke, Alph. List Cit. 1: 76, 163, 318, & 325 (1946), 2: 328, 335, 338, 348, 349, 529, & 601 (1948), 3: 690, 728, 880, 881, 884, & 968 (1949), and 4: 1035, 1048, 1054, 1059, 1078, 1086, & 1113. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71, 96, & 175. 1949; Moldenke, Phytologia 4: 403--404. 1953; Goodspeed & Stork, Univ. Calif. Publ. Bot. 28 (3): 117. 1955; Moldenke, Résumé 82, 112, 260, & 441. 1959.

Vargas collected this plant growing among other shrubs in a canyon.

Additional citations: PERU: Puno: Vargas 9644 (Ca--647162). BOLIVIA: El Beni: H. H. Rusby 2619 (Pr). La Paz: Asplund 1836 (S).

AEGIPHILA NERVOSA Urb.

Additional & emended literature: J. A. Clark, Card Ind. Gray Herb. 1903 & 1929; Moldenke, Brittonia 1: 252, 257, 275, 276, 449, 467--468, 472, 473, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 6 & 7. 1939; Moldenke, Prelim. Alph. List Invalid Names 3 & 4. 1940; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25, 26, & 85. 1942; Moldenke, Alph. List Cit. 1: 74, 102, 186, 188, 189, 325, & 326 (1946), 2: 408 (1948), 3: 813 & 853 (1949), and 4: 982. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46, 47, & 175. 1949; Moldenke, Phytologia 4: 433. 1953; Moldenke, Résumé 54, 56, 231, & 441. 1959.

Holdridge describes this plant as a shrub 1.5 meters tall, with greenish-yellow flowers blooming in July, and found it at an altitude of 1620 meters.

Additional citations: HISPANIOLA: Haiti: Holdridge 1895 (Mi, N).

AEGIPHILA NOVOFRIBURGENSIS Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 266, 350, & 472. 1934; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 1: 106 (1946), 2: 337 (1948), and 3: 694. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 74 & 175. 1949; Moldenke, Phytologia 4: 404. 1953; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA NOVOGRANATENSIS Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 134. 1933; Moldenke, Brittonia 1: 267, 347--349, & 474. 1934; Moldenke, Phytologia 1: 251--252. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 2: 333 & 642 (1948) and 4: 1041. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA OBDUCTA Vell.

Additional synonymy: Aegiphila obduta Vell. apud Mendes Magalhães, Anais V Reun. Anual Soc. Bot. Bras. 256, sphalm. 1956.

Additional & emended literature: Moldenke, Brittonia 1: 254, 257, 259, 280, 454--456, & 472--477. 1934; Moldenke, Geogr. Distrib. Avicenn. 25 & 35. 1939; Moldenke, Prelim. Alph. List Invalid Names 2 & 3. 1940; Moldenke, Alph. List Invalid Names 1--3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 54, 56, 77, 78, 94, 106, 107, 141, 168, 170, 171, 223, 226, 236--238, 250, & 255. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Alph. List Cit. 2: 329, 343, 345, 363--365, 368, 370, 445, 446, 485, 486, 503, 534, 550--552, 568, & 598 (1948), 3: 658, 670, 726, 736, 832, 854--856, 890, 907, 915, 916, & 920--922 (1949), and 4: 1014, 1015, 1041, 1046, 1050, 1066, 1087, 1111, 1135, & 1301. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75, 156, & 175. 1949; Moldenke, Phytologia 4: 404--405. 1953; Mendes Magalhães, Anais V Reun. Anual Soc. Bot. Bras. 256--257. 1956; Moldenke, Résumé 86, 212, 229--231, & 441. 1959; Angely, Ind. Ang. 9 & 10. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 149. 1960; Angely, Fl. Paran. 16: 36. 1960.

The species is described by recent collectors as a liana or "semi-liana-like shrub", with white flowers, blooming from April to July and in December, fruiting in August, September, and November, the young fruit green, found in "mata" at altitudes of 10 to 950 meters.

Additional citations: BRAZIL: Federal District: A. Lutz 1004 (Lz); Occhioni 371 (Rd). Rio de Janeiro: Bowie & Cunningham s.n. [1814--16] (N), s.n. [26 Maio 1815] (N); Brade 12547 [Herb. Jard. Bot. Rio Jan. 29512] (B); A. Lutz 538 (Z); Santos Lima 299 [Herb. Jard. Bot. Rio Jan. 29516] (B). Santa Catarina: Klein 780 (Sm), 1389 [Herb. Barb. Rodr. 10014] (N, Sm), 1422 [Herb. Barb. Rodr. 10011] (N, Sm), 1459 [Herb. Barb. Rodr. 10016] (S, Sm), 1521 (Sm), 1864 (Sm), 2273 [Herb. Barb. Rodr. 16282] (S), 2460 (Gg); Reitz 3574 (Le), 5854 [Herb. Barb. Rodr. 10006] (N, Sm); Reitz & Klein 801 [Herb. Barb. Rodr. 6324] (N), 2188 (Sm), 2273 (Sm), 3368 [Herb. Barb. Rodr. 14215] (N, Sm), 3855 (Sm), 4322 (Sm), 4412 [Herb. Barb. Rodr. 16276] (N, Sm), 6723 (Mm), 8918 (Mm), 9077 (Gg), 9405 (Gg), 9631 (Gg), 9688 (Gg). São Paulo: Bowie & Cunningham s.n. [May 29, 1815] (N).

AEGIPHILA OBOVATA Andr.

Additional & emended literature: Moldenke, Brittonia 1: 259, 269, 270, 380, 389, 391—395, 472, 476, & 477. 1934; Moldenke, Alph. List Common Names 10 & 30. 1939; Moldenke, Geogr. Distrib. Avicenn. 12 & 35. 1939; Moldenke, Prelim. Alph. List Invalid Names 1 & 4. 1940; Moldenke, Alph. List Invalid Names 1 & 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 29, 30, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 60, 67, 68, 201, & 246 (1946), 2: 437 & 564 (1948), 3: 918 (1949), and 4: 1007—1009, 1058, & 1133. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 56, 156, & 175. 1949; Moldenke, Phytologia 4: 405. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 405 & 408—409. 1955; Moldenke, Fam. 2 Verbenac. 24 & 27—28. 1955; Moldenke, Résumé 62, 212, 228, 231, & 441. 1959.

Cowan & Forster describe this species as a tree, 4 m. tall, with pendent branches and pale-yellow flowers, growing in the primary forest and on lower cultivated slopes, at altitudes of 150 to 600 meters.

Additional citations: TOBAGO: Cowan & Forster 1455 (Z).

AEGIPHILA OBTUSA Urb.

Literature: Urb., Symb. Ant. 5: 486. 1908; J. A. Clark, Card Ind. Gray Herb. 1908; Prain, Ind. Kew. Suppl. 4: 5. 1913; Moldenke, Brittonia 1: 264, 358—360, 472, & 473. 1934; Moldenke, Phytologia 1: 253. 1937; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 85. 1942; Moldenke, Alph. List Cit. 1: 7, 61, 259, 308, & 311. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 175. 1949; Moldenke, Résumé 54 & 441. 1959.

AEGIPHILA ODONTOPHYLLA Donn. Sm.

Additional & emended literature: Moldenke, Brittonia 1: 259, 267, 315, 351—352, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 16. 1939; Moldenke, Prelim. Alph. List Invalid Names 2. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 22 & 85. 1942; Moldenke, Alph. List Invalid Names 2. 1942; Moldenke, Alph. List Cit. 1: 325 (1946), 2: 332 (1948), 3: 692, 780, & 817 (1949), and 4: 1053 & 1058. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39 & 175. 1949; Moldenke, Phytologia 4: 406. 1953; Moldenke, Résumé 46, 229, & 441. 1959; J. A. Clark, Card Ind. Gray Herb.

AEGIPHILA OVATA Moldenke

Literature: Moldenke, Brittonia 1: 189. 1932; J. A. Clark, Card. Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 277, 441—442, & 474. 1934; Moldenke, Phytologia 1: 254. 1937; Moldenke, Geogr. Distrib. Avicenn. 23 & 28. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 39, & 85. 1942; Moldenke, Alph. List Cit. 1: 325 (1946), 2: 612 (1948), and 4: 1015. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71, 96, & 175. 1949; Moldenke, Résumé 82, 112, & 441. 1959.

AEGIPHILA PANAMENSIS Moldenke

Additional & emended literature: J. A. Clark, Card Ind. Gray Herb. 1931; Standl., Field Mus. Publ. Bot. 18: 997. 1938; Moldenke, Brittonia 1: 274, 375--376, 387, & 472--476. 1934; Moldenke, Geogr. Distrib. Avicenn. 16 & 17. 1939; Moldenke, Alph. List Common Names 15. 1939; Moldenke, Prelim. Alph. List Invalid Names 3. 1940; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 22, 23, & 85. 1942; Moldenke, Alph. List Cit. 1: 7, 58, 123, 167, 170, 268, 273, 319, & 320 (1946), 2: 339, 340, 347, 530, & 609 (1948), 3: 714, 715, 757, 780, 801, 816, 818, 918, 940, 959, & 978 (1949), and 4: 1005, 1034, 1036, 1038, 1046, 1048--1053, 1055, 1061, 1067, 1141, 1186, & 1304. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28, 39, 40, & 175. 1949; Moldenke, Phytologia 4: 406. 1953; Moldenke, Résumé 33, 46, 47, 230, & 441. 1959.

Bartlett & Lasser describe this plant as a shrub to 15 feet tall, flowering in September.

Additional citations: COSTA RICA: Alajuela: Brenes 4320 (N), 4395a [180a] (N), 5395 [180, 9557] (N). PANAMA: Panamá: Bartlett & Lasser 16998 (Mi).

AEGIPHILA PANICULATA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 253, 257, 273, 386--388, 399--402, 473, 474, & 476. 1934; Standl., Field Mus. Publ. Bot. 18: 997. 1938; Moldenke, Geogr. Distrib. Avicenn. 16--18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19, 22, 23, 30, & 85. 1942; Moldenke, Alph. List Cit. 1: 7, 57, 58, 170, 193, 319, & 326 (1946), 2: 340, 349, 351, & 610 (1948), 3: 757, 959, & 973 (1949), and 4: 1051, 1052, & 1068. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 34, 38--40, 59, & 175. 1949; Moldenke, Phytologia 4: 406. 1953; Moldenke, Résumé 41, 45--47, 65, & 441. 1959.

Recent collectors describe this species as a shrub 3--12 feet tall or a small tree 2.5 meters tall, with pale greenish-yellow or yellow flowers in July and September and orange fruit in December and January, growing in wet "matorrales" and "potreros" or in shrubby or forested ravines in the savanna zone, at 30 meters altitude. Shank & Molina R. 4900 exhibits very typical fruiting-calyses and fruit and the leaves densely punctate beneath. The Wedel 2517 collection has only immature fruit, but the leaves are densely punctate as in the previously mentioned specimen.

Additional citations: NICARAGUA: Zelaya: Shank & Molina R. 4900 (W--2085127). PANAMA: Bocas del Toro: Wedel 2517 (W--1892669). Canal Zone: Dodge & Allen 17471 (Mi). Panamá: Bartlett & Lasser 16901 (Mi, Mi).

AEGIPHILA PARAGUARIENSIS Briq.

Additional & emended literature: J. A. Clark, Card Ind. Gray Herb. 1904; Moldenke, Brittonia 1: 268, 324--328, 473, 474, & 477. 1934; Moldenke, Geogr. Distrib. Avicenn. 25 & 28. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 40, & 85. 1942; Moldenke, Alph. List Cit. 1: 79, 94, 114, 171, 201, 223,

237, 263, & 264 (1946), 2: 329, 332, 337, 363, 413, 433, & 486 (1948), 3: 665, 669, 692, 704, 711, 726, 869, 923, 947, & 969 (1949), and 4: 1070 & 1106. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75, 98, & 175. 1949; Moldenke, Phytologia 4: 406--407. 1953; Moldenke, Résumé 86, 115, & 441. 1959; Angely, Fl. Paran. 16: 36. 1960.

Prof. E. S. Flanders, in a letter to me dated March 13, 1959, states that he collected the insect scale Saissetia oleae (Bern.) on this species in São Paulo, Brazil. A kodachrome picture of the plant is preserved in my notes.

Additional citations: BRAZIL: Paraná: Hatschbach 6902 (Z). PARAGUAY: Hassler 4498 (Ca--944321--cotype, N--cotype), 5056 (Ca--944320--cotype, N--cotype), 6931 (Ca--944317--cotype, N--cotype).

AEGIPHILA PARVIFLORA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 254--256, 266, 328--329, 336, 341, 420, 473, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 20 & 25. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32, 36, & 85. 1942; Moldenke, Alph. List Cit. 1: 248 (1946), 2: 337 & 433 (1948), and 3: 694 & 955. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62, 75, & 175. 1949; Moldenke, Phytologia 4: 407. 1953; Moldenke, Résumé 70, 86, & 441. 1959; Angely, Ind. Ang. 10. 1959.

Murça Pires & Silva describe this plant as a small tree, found in periodically flooded campos.

Additional citations: BRAZIL: Pará: Murça Pires & Silva 4851 (Z).

AEGIPHILA PAUCIFLORA Standl.

Literature: Standl., Trop. Woods 16: 41. 1928; J. A. Clark, Card Ind. Gray Herb. 1928; Moldenke, Phytologia 1: 255--256. 1937; Moldenke, Brittonia 1: 254, 266, 313--314, & 476. 1938; Moldenke, Geogr. Distrib. Avicenn. 15. 1939; Moldenke, Carnegie Inst. Wash. Publ. 522: 203. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20 & 85. 1942; Moldenke, Alph. List Cit. 1: 319 (1946) and 3: 757 & 971. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 36 & 175. 1949; Moldenke, Résumé 43 & 441. 1959.

AEGIPHILA PAVONIANA Moldenke

Literature: Moldenke, Brittonia 1: 190--191. 1932; J. A. Clark, Card Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 277, 460--461, & 475. 1934; Moldenke, Phytologia 1: 256. 1937; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 85. 1942; Moldenke, Alph. List Cit. 1: 266 (1946) and 2: 459. 1948; Moldenke, Phytologia 2: 448. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 75. 1948; Moldenke, Alph. List Cit. 3: 801, 881, & 924. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 175. 1949; Moldenke, Résumé 78 & 441. 1959.

AEGIPHILA PENDULA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 269, 383—384, 418, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 20 & 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23, 32, 33, & 85. 1942; Moldenke, Alph. List Cit. 1: 268. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 40, 62, & 175. 1949; Moldenke, Alph. List Cit. 3: 820 & 959 (1949) and 4: 988, 1044, 1050, & 1051. 1949; Moldenke, Phytologia 4: 407. 1953; Moldenke, Mem. N. Y. Bot. Gard. 9: 175. 1955; Moldenke, Résumé 47, 70, 79, 230, & 441. 1959.

This plant is said to be a slender shrub with dull-yellow fruit in November, growing in forests at 1100 meters altitude.

Additional citations: VENEZUELA: Zulia: H. Pittier 10645 (Vi—istotype). ECUADOR: Napo—Pastaza: Asplund 18677 (S).

AEGIPHILA PENNELLII Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 136. 1933; Moldenke, Brittonia 1: 252, 267, 346—347, & 475. 1934; Moldenke, Phytologia 1: 257. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 75. 1948; Moldenke, Alph. List Cit. 3: 805 (1949) and 4: 1093. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA PERNAMBUCENSIS Moldenke

Additional literature: Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 1: 78 (1946), 2: 368 & 490 (1948), 3: 748, 814, & 839 (1949), and 4: 982, 1069, 1153, & 1243. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; Moldenke, Phytologia 4: 407. 1953; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA PERPLEXA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 252, 257, 269, 271, 388—389, 393, 472, & 475—477. 1934; Moldenke, Alph. List Common Names 13. 1939; Moldenke, Geogr. Distrib. Avicenn. 12 & 20. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 29, 30, 32, & 85. 1942; Moldenke, Alph. List Cit. 1: 6, 68, 180, 198, & 304 (1946), 2: 436 (1948), 3: 885, 894, & 976 (1949), and 4: 1008, 1009, 1024, 1058, 1133, & 1135. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 56, 57, 62, & 175. 1949; Moldenke, Phytologia 4: 407—408. 1953; Moldenke in Cheesman, Fl. Trin. & Tob. 2 (6): 405 & 410. 1955; Moldenke, Fam. 2 Verbenac. 24 & 29. 1955; Moldenke in Steyermark, Fieldiana 28: 1082. 1957; Moldenke, Résumé 62, 70, & 441. 1959.

Additional citations: VENEZUELA: Delta Amacuro: Rusby & Squires 316 (Ca—52344—istotype).

AEGIPHILA PERUVIANA Turcz.

Additional & emended literature: Jacks., Ind. Kew. 1: 46. 1893; Moldenke, Brittonia 1: 272, 274, 365, 368--370, & 475--477. 1934; Moldenke, Alph. List Common Names 8, 15, & 31. 1939; Moldenke, Geogr. Distrib. Avicenn. 25 & 28. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 39, & 85. 1942; Moldenke, Alph. List Cit. 1: 304, 324, & 325 (1946), 2: 331, 335, 337, & 616 (1948), 3: 713, 884, & 956 (1949), and 4: 1015, 1019, 1058, 1130, & 1131. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71, 96, & 175. 1949; Moldenke, Phytologia 4: 408. 1953; Goodspeed & Stork, Univ. Calif. Publ. Bot. 28: 131. 1955; Moldenke, Résumé 82, 113, & 441. 1959.

Woytkowski found this species growing in shrubbery on a riverbank, at an altitude of 820 meters, and describes it as a shrub 1.4 meters tall, with the flowers creamy and velvety, white stamens, brown anthers, the calyx yellow with a green hue, the "stalk green, leaf soft and silky, nerve on top pale-brown; stem pale-brown", blooming in February.

Additional citations: PERU: San Martín: Woytkowski 35183 (Ca--904805).

AEGIPHILA PLATYPHYLLA Briq.

Additional & emended literature: J. A. Clark, Card Ind. Gray Herb. 1904; Moldenke, Brittonia 1: 276, 278, 427--429, & 473. 1934; Moldenke, Geogr. Distrib. Avicenn. 28. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40 & 85. 1942; Moldenke, Alph. List Cit. 1: 264 (1946), 2: 332 & 336 (1948), and 3: 692. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 98 & 175. 1949; Moldenke, Phytologia 4: 408. 1953; Moldenke, Résumé 115 & 441. 1959.

Additional citations: PARAGUAY: Hassler 8056 (Ca--944319--isotype, N--isotype).

AEGIPHILA PLICATA Urb.

Literature: Urb., Symb. Ant. 3: 365. 1903; J. A. Clark, Card Ind. Gray Herb. 1903; Prain, Ind. Kew. Suppl. 3: 4. 1908; Urb., Symb. Ant. 5: 486. 1908; Moldenke, Brittonia 1: 252, 269, 359, 361--362, & 472. 1934; Moldenke, Phytologia 1: 259 (1937) and 1: 294. 1938; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 85. 1942; Moldenke, Alph. List Cit. 1: 39. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 175. 1949; Moldenke, Résumé 54 & 441. 1959.

AEGIPHILA PUBERULENTA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 271, 411--413, & 473. 1934; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, & 85. 1942; Moldenke, Alph. List Cit. 1: 169, 190, 265, & 322 (1946), 2: 329, 334, 336, & 346 (1948), 3: 757 (1949), and 4: 1062, 1078, & 1131. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, & 175. 1949; Moldenke, Phytologia 4: 408. 1953; Moldenke, Résumé 65, 70, & 441. 1959.

AEGIPHILA PULCHERRIMA Moldenke

Literature: Moldenke, Brittonia 1: 191. 1932; J. A. Clark, Card Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 254, 259, 276, 435—437, & 476. 1934; Moldenke, Phytologia 1: 259—260. 1937; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Cit. 1: 319 (1946) and 3: 915. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Résumé 82 & 441. 1959.

AEGIPHILA PUNCTATA Turcz.

Listed by me hitherto as a valid species, examination of the type collection has now revealed that this name belongs in the synonymy of Petitia domingensis Jacq.

AEGIPHILA PURPURASCENS Moldenke

Additional literature: Moldenke, Phytologia 4: 408. 1953; Moldenke, Mem. N. Y. Bot. Gard. 9: 176. 1955; Moldenke, Résumé 79 & 441. 1959.

AEGIPHILA QUINDUENSIS (H.B.K.) Moldenke

Additional literature: Schult. in Roem. & Schult., Syst. Veg. Mant. 3: 50. 1827; Walp., Repert. 4: 72. 1845; Fedde, Repert. Sp. Nov. 42: 248. 1937; Moldenke, Geogr. Distrib. Avicenn. 18 & 20. 1939; Pittier, Supl. Pl. Usual. Venez. 54. 1939; Moldenke, Prelim. Alph. List Invalid Names 2 & 33. 1940; Moldenke, Alph. List Invalid Names 2 & 34. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, & 85. 1942; Moldenke, Alph. List Cit. 1: 157, 243, & 326 (1946), 2: 346, 348, 529, & 603 (1948), 3: 758, 819—821, & 976 (1949), and 4: 1044, 1050, 1064, 1069, 1073, 1078, 1080, & 1131. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, & 175. 1949; Moldenke, Phytologia 4: 408—409. 1953; Moldenke in Steyermark, Fieldiana 28: 1082. 1957; Moldenke, Résumé 65, 70, 229, 232, 330, & 441. 1959.

Williams has found this species in transition forests at an altitude of 760 meters. The sheet of his no. 10251, cited below from the Britton Herbarium, was formerly no. 946420 in the herbarium of the Chicago Natural History Museum. Aristeguieta says of this plant "madera muy quebradiza". It has been collected in anthesis also in March.

Additional citations: VENEZUELA: Aragua: Ll. Williams 10251 (Ca—663473, Ew, Mi, N). Federal District: H. Pittier 10404 (Vi). Lará: Aristeguieta 3944 (N). Yaracuy: Aristeguieta 3840 (N).

AEGIPHILA RACEMOSA Vell.

Additional & emended literature: Jacks., Ind. Kew. 1: 47. 1893; Martyn, Ind. Phan. Jerman Herb. 461, mss. 1937; Moldenke, Brittonia 1: 247, 252, 275, 395, 423, 426, 447—450, 462, & 472—477. 1934; Moldenke, Geogr. Distrib. Avicenn. 18, 20, 21, & 25. 1939; Moldenke, Alph. List Common Names 33. 1939; Moldenke, Prelim. Alph. List Invalid Names 1 & 3. 1940; Moldenke, Alph. List Invalid

Names 1 & 2. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, 33, 36, & 85. 1942; Moldenke, Alph. List Cit. 1: 5, 36, 40, 60, 79, 112, 117, 141, 155, 156, 164, 240, 249, 266, 272, 273, 318, 319, & 322 (1946), 2: 332, 333, 362, 353, 403, 432, 446, 582, 603, 610, & 612 (1948), 3: 709, 711, 724, 747, 815, 886, 888, 905, 950, & 974 (1949), and 4: 1017, 1020, 1044, 1047, 1054, 1060, 1067, 1071, 1087, & 1193. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, 65, 67, 68, 75, & 175. 1949; Moldenke, Phytologia 4: 409. 1953; Moldenke, Résumé 65, 70, 74, 76, 78, 86, 228, 230, 231, & 441. 1959.

Cowan describes this plant as a vine or liana climbing over shrubs 2.5 m. tall, pendent at the tips, with pale-yellow buds and flowers in November and December, found growing on heavily forested hills from 70 to 300 meters altitude. Black & Lobato found it in "capoeira", while Dionisio encountered it in sandy "terra firma". Steyermark describes it as a woody vine, with the leaves subcoriaceous, dark-green above, pale-green beneath, the young fruit spherical to ovoid-oblong, pale-green in May, growing at altitudes of 1000 to 1700 meters.

Additional citations: VENEZUELA: Bolívar: Steyermark 75420 (Z). BRITISH GUIANA: J. E. Beckett 8447 (S). SURINAM: Cowan 38996 (N). BRAZIL: Amapá: G. A. Black s.n. [Abril 1950] (Be--55672); Black & Lobato 50-9604 (Be--55707); Cowan 38479 (N). Amazonas: Chagas s.n. [Herb. Inst. Nac. Pesq. Amaz. 1342] (Ok); Dionisio s.n. [Herb. Inst. Nac. Pesq. Amaz. 3647] (Ok). Pará: Fröes 28480 (Be--75246).

AEGIPHILA RETICULATA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 138. 1933; Moldenke, Brittonia 1: 271, 413, & 475. 1934; Moldenke, Phytologia 1: 261. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85 (1942) and [ed. 2], 59 & 175. 1949; Moldenke, Alph. List Cit. 3: 758 (1949) and 4: 1068. 1949; Moldenke, Résumé 65 & 441. 1959.

AEGIPHILA RIEDELIANA Schau.

Additional & emended literature: Jacks., Ind. Kew. 1: 47. 1893; Moldenke, Brittonia 1: 265, 305, 311--313, 475, & 476. 1934; Moldenke, Alph. List Common Names 7. 1939; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Prelim. Alph. List Invalid Names 3. 1940; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 1: 78. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 78. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; Moldenke, Alph. List Cit. 3: 695, 704, 736, 745, 751, 840, 855, & 915 (1949) and 4: 1013 & 1014. 1949; Moldenke, Phytologia 4: 409--410. 1953; Moldenke, Résumé 86, 231, & 441. 1959; Angely, Ind. Ang. 10. 1959.

Klein collected this species at altitudes of 60 to 400 meters and found it to have orange fruit in August.

Additional citations: BRAZIL: Santa Catarina: Klein 562 [Herb. Barb. Rodr. 8383] (N, Z); Reitz & Klein 3915 (N, Sm), 7016 (Mm).

AEGIPHILA RIMBACHII Moldenke

Literature: Moldenke, Phytologia 1: 261—263. 1937; Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Phytologia 1: 397. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 85. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 79. 1948; Moldenke, Alph. List Cit. 2: 336 (1948), 3: 758 & 857 (1949), and 4: 1071. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 69 & 175. 1949; Moldenke, Résumé 79 & 441. 1959.

AEGIPHILA RORAIMENSIS Moldenke

Additional & emended literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 138—139. 1933; Moldenke, Brittonia 1: 279, 453, & 472. 1934; Moldenke, Phytologia 1: 263. 1937; Moldenke, Geogr. Distrib. Avicenn. 21. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 85. 1942; Moldenke, Alph. List Cit. 1: 11. 1946; Moldenke, Phytologia 2: 450. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62, 65, & 175. 1949; Moldenke, Alph. List Cit. 3: 976. 1949; Moldenke in Steyermark, Fieldiana 28: 1082. 1957; Moldenke, Résumé 70, 74, & 441. 1959.

AEGIPHILA SALTICOLA Moldenke

Additional literature: Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 1: 215 (1946), 2: 330 & 445 (1948), and 3: 731. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Phytologia 4: 410 & 434. 1953; Moldenke, Résumé 86, 112, & 441. 1959; Angely, Ind. Ang. 10. 1959.

Fróes reports that this species is a low shrub, found in rocky soil, on "terra firma", and in old clearings.

Additional citations: BRAZIL: Pará: Mexia 5922 (Go—isotype). SÃO LUIZ ISLAND: Fróes 11738 (W—1905851).

AEGIPHILA SCANDENS Moldenke

Additional literature: Moldenke in Fedde, Repert. Sp. Nov. 37: 212. 1934; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 1: 167 (1946) and 4: 1015 & 1078. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; Moldenke, Phytologia 4: 410 & 434. 1953; Moldenke, Résumé 86 & 441. 1959; Angely, Ind. Ang. 10. 1959.

This species has been collected in "capoeira" and on sandy "terra firma". It bears a striking similarity in habit to A. racemosa Vell.

Additional citations: BRAZIL: Amazonas: Francisco & Luis s.n. [Herb. Inst. Nac. Pesq. Amaz. 3596] (2).

AEGIPHILA SCHIMPFII Moldenke

Additional literature: Moldenke, Geogr. Distrib. Avicenn. 22. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33 & 85 (1942) and [ed. 2], 69 & 175. 1949; Moldenke, Alph. List Cit.

3: 901 (1949) and 4: 982. 1949; Moldenke, Phytologia 4: 410—411. 1953; Moldenke, Mem. N. Y. Bot. Gard. 9: 176. 1955; Moldenke, Résumé 79, 231, & 441. 1959.

AEGIPHILA SELLOWIANA Cham.

Additional & emended literature: Jacks., Ind. Kew. 1: 47. 1893; Moldenke, Brittonia 1: 257—259, 268, 311, 326, 329, 330, 332—335, 339, 341, & 472—477. 1934; Moldenke, Geogr. Distrib. Avicenn. 25, 28, & 35. 1939; Moldenke, Alph. List Common Names 7, 8, & 14. 1939; Moldenke, Prelim. Alph. List Invalid Names 2—4. 1940; Moldenke, Alph. List Invalid Names 2 & 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 39, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 3, 29, 40, 43, 45, 56, 78, 79, 90, 104, 106, 107, 113, 114, 141, 164, 170—172, 177, 210—212, 226, 227, 236, 238, 241, 270, 271, 286, 289, 290, 298, 305, & 326 (1946) and 2: 329, 330, 341—343, 345, 347, 350, 361—365, 368—370, 433—435, 445, 446, 448, 485, 490, 503, 530, 533—535, 550—552, 574, 598, 619, & 633. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 82. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75, 96, 156, & 175. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Alph. List Cit. 3: 669, 670, 675, 704, 710, 711, 725, 726, 730, 736, 751, 774, 800, 803, 815, 824, 840, 844—846, 854—856, 884, 889, 890, 900, 915, 923, & 926 (1949) and 4: 1014, 1020, 1022, 1025, 1058, 1066—1068, 1081, 1094, 1106, 1123, 1124, 1251, 1283, & 1301. 1949; Moldenke, Phytologia 4: 411. 1953; Rambo, Sellowia 6: 59, 84, & 153. 1954; Veloso & Klein, Sellowia 8: 124a, 126a, 140a, 141, 174a, 187, & 220. 1957; Angely, Fl. Paran. 11: 15, 26, & 30. 1957; Moldenke, Résumé 79, 86, 113, 212, 229—232, & 441. 1959; Angely, Ind. Ang. 10. 1959; Reitz, Sellowia 11: 66 & 84. 1959; Veloso & Klein, Sellowia 11 (10): chart betw. p. 28 & 29, betw. p. 50 & 51, betw. p. 94 & 95, & 105. 1959; Angely, Fl. Paran. 16: 36. 1960; Rennó, Levant. Herb. Inst. Agron. Minas 149. 1960.

Irwin describes this plant as an erect few-branched shrub, to 4 m. tall, common in red clay soil of secondary forests, flowering in November. Smith & Klein have found it on campos, in bogs, and in pinewoods, at an altitude of 800 meters. Asplund says that it is a tree to 15 m. tall, with white or pale-yellow flowers, blooming in April and December, growing in "rastrojo" at 900 to 1100 meters altitude. It has been misidentified as A. mediterranea Vell. in herbaria, and Angely records the name "capoeira branca". Reitz & Klein describe the flowers as white, record the common names "gaioleira", "pau gaiola", and "pau-de-gaiola", and state that it grows at altitudes of from 10 to 450 meters.

Additional citations: ECUADOR: Napo-Pastaza: Asplund 18789 (S), 20117 (S). BRAZIL: Minas Gerais: Brade 13460 [Herb. Jard. Bot. Rio Jan. 29514] (B); P. Clausen s.n. [Minas Geraes] (B); Frambach 123 (B); Irwin 2064 (N, W—2281263); A. Lutz 996 (Lz); Macedo 2850 (S, S); Mexia 4203 (Go), 4500 (Go), 5396 (Go). Paraná: Tessmann s.n. [10/2/1937] (Ih—5911). Rio de Janeiro: Brade

15096 [Herb. Jard. Bot. Rio Jan. 28220] (B); Glaziou 14164 (B); Patschke 179 (B). Santa Catarina: Klein 282 [Herb. Barb. Rodr. 4637] (N), 1854 [Herb. Reitz 10008] (N, Sm), 2180 [Herb. Barb. Rodr. 14208] (N, Sm); Reitz 3379 (Rd); Reitz & Klein 4312 [Herb. Barb. Rodr. 16277] (N, Sm), 6510 [Herb. Barb. Rodr. 16274] (S, Sm), 7259 (Mm), 8257 (Mm), 8327 (Mm), 9344 (Gg); Smith & Klein 8460 (Ok). State undetermined: Patschke s.n. [Brasilien] (B).

ÆGIPHILA SESSILIFLORA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 255, 264, 301--303, & 472. 1934; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 1: 11 & 133 (1946) and 4: 1064, 1076, 1078, & 1296. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Phytologia 4: 412. 1953; Moldenke, Résumé 65 & 441. 1959.

Cuatrecasas has found this species growing at altitudes of 1600 to 1700 meters, fruiting in March.

Additional citations: COLOMBIA: Cundinamarca: Cuatrecasas 13600 (N), 13610 (N).

ÆGIPHILA SETIFORMIS Rusby

Additional & emended literature: Moldenke, Brittonia 1: 255, 276, 431, 433--435, 441, & 472. 1934; Moldenke, Geogr. Distrib. Avicenn. 28. 1939; Moldenke, Prelim. Alph. List Invalid Names 1. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 & 85. 1942; Moldenke, Alph. List Invalid Names 1. 1942; Moldenke, Alph. List Cit. 1: 29, 301, & 304 (1946), 2: 332 & 435 (1948), and 4: 1020, 1046, & 1058. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 96 & 175. 1949; Moldenke, Phytologia 4: 412. 1953; Moldenke, Résumé 113, 228, & 441. 1959; J. A. Clark, Card Ind. Gray Herb.

ÆGIPHILA SKUTCHII Moldenke

Additional & emended literature: Moldenke, Geogr. Distrib. Avicenn. 13 & 15. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15 & 19. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 83. 1948; Moldenke, Alph. List Cit. 2: 345 & 349 (1948) and 3: 714, 715, & 940. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28 & 34. 1949; Moldenke, Phytologia 4: 412. 1953; Moldenke, Résumé 34, 41, & 441. 1959.

Matuda reports the flowers of this species as white, and found the plant growing among secondary growth at 1800 meters altitude, blooming in July.

Additional citations: MEXICO: Chiapas: Matuda 4190 (Mi, W--1891319).

ÆGIPHILA SMITHII Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 255, 259, 279, 417--420, 474, 476, & 477. 1934; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verben-

ac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Cit. 1: 323--325 (1946) and 2: 335, 611, 612, & 616. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 84. 1948; Moldenke, Alph. List Cit. 3: 724 & 731 (1949) and 4: 988, 1063, 1064, 1067, & 1130. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Phytologia 4: 412--413. 1953; Moldenke, Résumé 65, 82, & 441. 1959.

Schultes & Cabrera describe this plant as a bush with yellow flowers, blooming in July, and found it at an altitude of 250 meters.

Additional citations: COLOMBIA: Vaupés: Schultes & Cabrera 13173 (W--2113105). PERU: Loreto: Mexia 6499 (Ca--510225).

AEGIPHILA SORDIDA Moldenke

Literature: Moldenke, Brittonia 1: 192--193. 1932; J. A. Clark, Card Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 264, 299--300, & 477. 1934; Moldenke, Phytologia 1: 268 (1937) and 1: 295. 1938; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Cit. 1: 324 (1946) and 2: 612. 1948; Moldenke, Phytologia 3: 47. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Alph. List Cit. 4: 1064 & 1130. 1949; Moldenke, Résumé 82 & 441. 1959.

AEGIPHILA SPICATA (Rusby) Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 277, 432--433, 472, & 475. 1934; Moldenke, Geogr. Distrib. Avicenn. 28. 1939; Moldenke, Prelim. Alph. List Invalid Names 1 & 15. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 & 85. 1942; Moldenke, Alph. List Invalid Names 1 & 13. 1942; Moldenke, Alph. List Cit. 1: 29 & 325 (1946) and 3: 884. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 96 & 175. 1949; Moldenke, Phytologia 4: 413. 1953; Moldenke, Résumé 113, 228, 254, & 441. 1959.

AEGIPHILA SPLENDENS Schau.

Additional & emended literature: Moldenke, Brittonia 1: 259, 267, 330, 344--345, & 475. 1934; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Suppl. List Invalid Names 1. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Invalid Names 4. 1942; Moldenke, Alph. List Cit. 2: 340, 347, & 361 (1948) and 3: 695. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; Moldenke, Phytologia 4: 413. 1953; Moldenke, Résumé 86, 232, & 441. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA SPRUCEANA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 139--140. 1933; Moldenke, Brittonia 1: 255, 279, 416--417, 420, 474, & 476. 1934; Moldenke, Phytologia 1: 268. 1937; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Phytologia 1: 400. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85.

1942; Moldenke, *Phytologia* 3: 48. 1948; H. N. & A. L. Moldenke, *Pl. Life* 2: 84. 1948; Moldenke, *Alph. List Cit.* 2: 331, 337, & 618 (1948) and 3: 694, 955, & 956. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 75 & 175. 1949; Moldenke, *Résumé* 86 & 441. 1959; Angely, *Ind. Ang.* 10. 1959.

AEGIPHILA STANDLEYI Moldenke

Literature: Moldenke in Fedde, *Repert. Sp. Nov.* 33: 140. 1933; J. A. Clark, *Card Ind. Gray Herb.* 1933; Moldenke, *Brittonia* 1: 252, 266, 314—316, & 476. 1934; Moldenke, *Phytologia* 1: 268—269. 1937; Standl., *Field Mus. Publ. Bot.* 18: 997. 1938; Moldenke, *Geogr. Distrib. Avicenn.* 17. 1939; Moldenke, *Phytologia* 1: 400. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 19, 22, & 85. 1942; H. N. & A. L. Moldenke, *Pl. Life* 2: 84. 1948; Moldenke, *Phytologia* 3: 48. 1948; Moldenke, *Alph. List Cit.* 2: 348 (1948), 3: 960 (1949), and 4: 1052. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 34, 39, & 175. 1949; Moldenke, *Résumé* 41, 46, & 441. 1959.

AEGIPHILA STEINBACHII Moldenke

Additional literature: Moldenke, *Phytologia* 1: 239. 1937; J. A. Clark, *Card Ind. Gray Herb.* 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 39 & 85 (1942) and [ed. 2], 96 & 175. 1949; Moldenke, *Alph. List Cit.* 3: 967 & 968. 1949; Moldenke, *Phytologia* 4: 413. 1953; Moldenke, *Résumé* 113 & 441. 1959.

AEGIPHILA STEYERMARKII Moldenke

Literature: Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 62 & 175. 1949; Moldenke, *Alph. List Cit.* 3: 975. 1949; Moldenke in Steyermark, *Fieldiana* 28: 512—513. 1953; Moldenke, *Phytologia* 4: 413. 1953; Steyermark, *Fieldiana* 28: 1178. 1957; Moldenke, *Résumé* 70 & 441. 1959.

Maguire describes this species as a shrub or tree, 2 m. tall, infrequent in woodland islands on savannas, at an altitude of 1800 meters, flowering and fruiting in December.

Additional citations: VENEZUELA: Bolívar: B. Maguire 32851 (N).

AEGIPHILA STEYERMARKII var. *MACROPHYLLA* Moldenke

Literature: Moldenke, *Résumé* 70 & 441. 1959; Moldenke, *Phytologia* 7: 119. 1960.

Collectors describe this plant as a tree or depressed tree 2—6 m. tall, or a shrub 2—3 m. tall, with pale-tawny pubescence, the leaves subcoriaceous or firmly membranous, deep-green and shiny above, paler green beneath, the calyx yellowish-green, the corolla white and fragrant, filaments white, anthers stramineous, and the fruit finally yellowish or turning dull-orange. It is occasional in swampy savannas or on west-facing slopes, infrequent in scrub forest, or locally frequent in open forests on laterite deposits, at altitudes of 1895 to 2600 meters, flowering and fruiting in February and March.

Additional citations: VENEZUELA: Bolívar: B. Maguire 33423 (N), 33457 (N, S); Steyermark 74964 (Z—type); Steyermark & Wur-

dack 810 (N), 848 (N), 1082 (N).

AEGIPHILA STEYERMARKII var. **OBTUSIFOLIA** Moldenke

Literature: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62 & 175. 1949; Moldenke, Alph. List Cit. 3: 976. 1949; Moldenke in Steyermark, Fieldiana 28: 513. 1953; Moldenke, Phytologia 4: 413. 1953; Steyermark, Fieldiana 28: 1178. 1957; Moldenke, Résumé 70 & 441. 1959.

Maguire describes this plant as a tree, 5 m. tall, infrequent around thickets, at an altitude of 1700 meters, blooming in January.

Additional citations: VENEZUELA: Bolívar: B. Maguire 32930 (N, S).

AEGIPHILA SUFFLAVA Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 256, 275, 461—462, 474, 476, & 477. 1934; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Cit. 1: 323 & 324 (1946), 2: 327, 612, & 616 (1948), and 4: 988, 1064, 1130, & 1131. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Phytologia 4: 413. 1953; Moldenke, Résumé 82 & 442. 1959.

AEGIPHILA SUFFLAVA var. **KLUGII** Moldenke

Literature: Moldenke, Phytologia 1: 295. 1938; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 67. 1948; Moldenke, Alph. List Cit. 2: 343 & 616. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Résumé 82 & 442. 1959.

AEGIPHILA SURFACEANA Moldenke

Additional & emended literature: J. A. Clark, Card Ind. Gray Herb. 1931; Moldenke, Brittonia 1: 269, 271, 405—408, 473, 474, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Prelim. Alph. List Invalid Names 4. 1940; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; Moldenke, Alph. List Cit. 1: 141, 274, & 322. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 1. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 85. 1948; Moldenke, Alph. List Cit. 2: 331, 445, 446, 571, 572, & 624 (1948), 3: 905 (1949), and 4: 985, 1035, & 1222. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; Moldenke, Phytologia 4: 414. 1953; Moldenke, Résumé 86, 231, & 442. 1959; Angely, Ind. Ang. 10. 1959.

Recent collectors call this plant a shrub or subshrub, 1—3 meters tall, the branches green, and the flowers greenish or yellow.

Additional citations: BRAZIL: Amazonas: Herb. Inst. Nac. Pesq. Amaz. 3949 (Z); Luis s.n. [Herb. Inst. Nac. Pesq. Amaz. 1582] (Ok).

AEGIPHILA SWARTZIANA Urb.

Literature: Urb., Symb. Antil. 3: 364. 1903; Prain, Ind. Kew. Suppl. 3: 4. 1908; Moldenke, Brittonia 1: 253, 254, 264, 354--356, 362, 473, & 476. 1934; Moldenke, Phytologia 1: 269. 1937; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Phytologia 1: 400. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 85. 1942; Moldenke, Alph. List Cit. 1: 259, 272, 315, & 326. 1946; Moldenke, Phytologia 3: 48. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 85. 1948; Moldenke, Alph. List Cit. 4: 982, 1038, & 1139. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 175. 1949; Moldenke, Résumé 54 & 442. 1959.

Additional citations: JAMAICA: W. Harris 11716 (Vi).

AEGIPHILA SYLVATICA Moldenke

Literature: Moldenke in Fedde, Repert. Sp. Nov. 33: 140--141. 1933; J. A. Clark, Card Ind. Gray Herb. 1933; Moldenke, Brittonia 1: 266, 349--350, & 474. 1934; Moldenke, Phytologia 1: 269--270. 1937; Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 2: 610 (1948) and 4: 1060. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Résumé 65 & 442. 1959.

AEGIPHILA TERNIFOLIA (H.B.K.) Moldenke

Additional & emended literature: Moldenke, Brittonia 1: 252, 260, 263, 280--282, 473, & 474. 1934; Moldenke, Geogr. Distrib. Avicenn. 18 & 20. 1939; Moldenke, Prelim. Alph. List Invalid Names 5 & 25. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30, 32, & 85. 1942; Moldenke, Alph. List Invalid Names 4 & 24. 1942; Moldenke, Alph. List Cit. 1: 243 & 275 (1946) and 2: 327, 328, 573, & 643. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59, 62, & 175. 1949; Moldenke, Phytologia 4: 414. 1953; Moldenke, Résumé 65, 70, 234, 284, & 442. 1959.

AEGIPHILA TRIFIDA Sw.

Additional & emended literature: Jacks., Ind. Kew. 1: 47. 1893; Moldenke, Brittonia 1: 253, 254, 256, 258, 264, 292, 320, 355--357, 361, 362, 472, 473, 475, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Prelim. Alph. List Invalid Names 4. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 85. 1942; Moldenke, Alph. List Invalid Names 3. 1942; Moldenke, Alph. List Cit. 1: 61, 258, 259, 303, 310, 311, 325, & 326 (1946), 2: 502 (1948), 3: 706, 720, & 779 (1949), and 4: 982, 1029, 1033, & 1039. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 175. 1949; Moldenke, Phytologia 4: 414--415. 1953; Moldenke, Résumé 54, 231, & 442. 1959.

AEGIPHILA TRUNCATA Moldenke

Additional literature: Moldenke, Geogr. Distrib. Avicenn. 18. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 30 & 85. 1942; Moldenke, Alph. List Cit. 1: 222 (1946), 2: 344 (1948), 3: 758 (1949), and 4: 1068, 1074, & 1078. 1949.

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